Communication Server 1000M and Meridian 1 Large System Maintenance Avaya Communication Server 1000

Release 7.6
NN43021-700
Issue 06.01
March 2013

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Contents

Chapter 1: New in this release

The following section details what's new in this document for Avaya Communication Server 1000 Release 7.6.

Features

There are no updates to the feature descriptions in this document.

Other changes

There are no other changes.

Revision history

March 2013	Standard 06.01. This document is up-issued to support Avaya Communication Server 1000 Release 7.6.
January 2012	Standard 05.04. This document is up-issued to support Communication Server 1000 Release 7.5.
December 2011	Standard 05.03. This document is up-issued to support Communication Server 1000 Release 7.5. Support for NT8D01 XPEC LED binary display is added.
February 2011	Standard 05.02. This document is up-issued to remove legacy feature and hardware content that is no longer applicable to or supported by Communication Server 1000 systems.
November 2010	Standard 05.01. This document is up-issued to support Avaya Communication Server 1000 Release 7.5.
June 2010	Standard 04.01. This document is up-issued to support Avaya Communication Server 1000 Release 7.0.
January 2010	Standard 03.02. This document is up-issued to support Communication Server 1000 Release 6.0.

May 2009	Standard 03.01. This document is up-issued to support Communication Server 1000 Release 6.0.
October 2008	Standard 02.02. This document is up-issued to support additions to technical content for release 5.5 to add a single slot FIJI NTRB33BBE5 replacement card.
December 2007	Standard 02.01. This document is up-issued to support Communication Server 1000 Release 5.5.
June 2007	Standard 01.02. This document is up-issued to remove the Confidential statement.
May 2007	Standard 01.01. This document is issued to support Communication Server 1000 Release 5.0. This document contains information previously contained in the following legacy document, now retired: *Communication Server 1000M and Meridian 1: Large System Maintenance (553-3021-500)*.
February 2007	Standard 5.00. This document is up-issued to reflect addition of content in response to CR Q01522450.
January 2007	Standard 4.00. This document is up-issued to reflect addition of content in response to CR Q01542507.
August 2005	Standard 3.00. This document is up-issued to support Communication Server 1000 Release 4.5.
September 2004	Standard 2.00. This document is up-issued for Communication Server 1000 Release 4.0.
October 2003	Standard 1.00. This document is new for Succession 3.0. It was created to support a restructuring of the Documentation Library, which resulted in the merging of multiple legacy documents. This new document consolidates information previously contained in the following legacy documents, now retired: • General Maintenance (553-3001-500) • Fault Clearing (553-3001-510) • Hardware Replacement (553-3001-520)

Chapter 2: Customer service

Visit the Avaya Web site to access the complete range of services and support that Avaya provides. Go to www.avaya.com or go to one of the pages listed in the following sections.

Navigation

Getting technical documentation

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Chapter 3: Overview

This document is a global document. Contact your system supplier or your Avaya representative to verify that the hardware and software described are supported in your area.

Subject

This document describes maintenance for Meridian 1 and Avaya Communication Server 1000M systems.

Note on legacy products and releases

This document contains information about systems, components, and features that are compatible with Avaya Communication Server 1000 software. For more information about legacy products and releases, click the **Documentation** link under **Support** on the Avaya home page:

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Applicable systems

This document applies to the following Avaya Communication Server 1000 (Avaya CS 1000) systems:

- Communication Server 1000M Single Group (CS 1000M SG)
- Communication Server 1000M Multi Group (CS 1000M MG)
- Communication Server 1000E (CS 1000E)

System migration

When you upgrade a Meridian 1 system to run Avaya Communication Server 1000 software and configure it to include a Signaling Server, it become an Avaya Communication Server

1000M system. Table 1: Meridian 1 systems to CS 1000M systems on page 18 lists each Meridian 1 system that supports an upgrade path to an Avaya CS 1000M system.

Table 1: Meridian 1 systems to CS 1000M systems

This Meridian 1 system	Maps to this CS 1000M system
Meridian 1 PBX 61C	CS 1000M Single Group
Meridian 1 PBX 81C	CS 1000M Multi Group

For more information, see the following document:

- *Avaya Communication Server 1000M and Meridian 1 Large System Upgrades Overview, NN43021-458*.

Intended audience

This document is intended for individuals responsible for maintaining Large Systems.

Conventions

Terminology

The following systems are referred to generically as "Large System":

- Communication Server 1000M Single Group (CS 1000M SG)
- Communication Server 1000M Multi Group (CS 1000M MG)
- Meridian 1 PBX 61C
- Meridian 1 PBX 81C

Related information

This section lists information sources that relate to this document.

Technical publications

The following technical publications are referenced in this document:

- *Avaya Features and Services Fundamentals (NN43001-106)*
- *Avaya Equipment Identification Reference (NN43001-254)*
- *Avaya Circuit Card Reference (NN43001-311)*
- *Avaya System Management Reference (NN43001-600)*
- *Avaya Software Input Output Maintenance (NN43001-711)*
- *Avaya Telephones and Consoles Fundamentals (NN43001-567)*
- *Avaya ISDN Primary Rate Interface Fundamentals (NN43001-569)*
- *Avaya Software Input Output Reference – Maintenance (NN43001-711)*
- *Avaya Software Input Output Reference – System Messages (NN43001-712)*
- *Avaya ISDN Primary Rate Interface Maintenance (NN43001-717)*
- *Avaya Communication Server 1000 Fault Management – SNMP (NN43001-719)*
- *Avaya Communication Server 1000M and Meridian 1 Large System Overview (NN43021-110)*
- *Avaya Communication Server 1000M and Meridian 1 Large System Planning and Engineering (NN43021-220)*
- *Avaya Communication Server 1000M and Meridian 1 Large System Installation and Commissioning (NN43021-310)*

Other documentation

The following publications are referenced in this document:

- *Candeo Power System User Guide* (P0914425)
- *Candeo SP 48300 Power System AP6C55AA User Manual* (P7000154)

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Chapter 4: Communicating with the system

Contents

This section contains information on the following topics:

Overview

Information can be exchanged through system terminals and maintenance telephones. When equipment is replaced, commands are often sent to the system software in order to disable faulty equipment and to enable and test newly-installed equipment.

The Multi User Login feature allows more than one device to interact with the system. See *Avaya System Management Reference (NN43001-600)* for details about this feature.

System terminal

Send maintenance commands and receive system messages by accessing the CPU through an RS-232 device, such as a video display terminal (VDT) or teletypewriter (TTY).

For most systems, the CPU displays or prints only the message code. For the interpretation of the code and any required action, see *Avaya Software Input Output Reference – System Messages (NN43001-712)*.

Access through the system terminal

Access through a system terminal requires a login procedure. All system passwords are initially set as 0000, but passwords can be changed in the Configuration Record (LD 17). If a sysload occurs before a new password is saved in a data dump, the last active password remains valid.

Each system has two levels of passwords: level 1 for general use and level 2 for administrative use. Either password is accepted in the login procedure.

Access through the system terminal

1. Press the return key.
    a. If the response is a period (.), you are ready to log onto the system.
    b. If the response is OVL111 nn TTY x or OVL111 nn SL1

       someone else is logged into the system. When they logged off, press return and go to step 2 on page 22.
    c. If the response is OVL111 nn IDLE or OVL111 nn BKGD

       you are ready to log onto the system. Go to step 2 on page 22.
    d. If the response is OVL000 >

       you are already logged into the system. Go to step 5 on page 22.

   Responses vary with different Background Terminal packages.
2. Log on to the system.
3. The normal response is

   PASS?

   If there is any other response, see *Avaya Software Input Output Maintenance, NN43001-711*.
4. Enter either the level 1 or level 2 password and press the return key. If the password is correct, the system responds with the prompt >.
5. Load a program by entering

   `LD xx` "xx" represents the number of the program
6. Perform tasks.
7. End the program by entering

   `END` or ****
8. Always log out of the system.

   Background routines are then loaded automatically.

Local and remote access

A terminal or a modem must remain permanently connected to an SDI port in a network slot to provide a constant I/O interface to the system. Although only one device can communicate with the system at a time, many devices can be installed at local and remote locations.

When a system terminal is installed locally, it is connected directly to a Serial Data Interface (SDI) card, located within a module. When a system terminal is installed at a remote location, modems (or data sets) and a telephone line are required between the terminal and the SDI card.

Caution:

If a Hayes command-set compatible (smart) modem is used at the system end, select the following:

- dumb mode of operation
- Command Recognition OFF
- Command Echo OFF

before connecting the modem to the SDI port. Refer to the modem instructions to configure the mode of operation.

If a printer is connected to an SDI port (locally or remotely), disable XON/XOFF flow control so that no characters or signals are sent to the port, to avoid a "ping-pong" effect.

Figure 1: Local and remote access to a system terminal on page 24 shows typical system terminal configurations. See "Access through the system terminal on page 22" for the access procedure.

Refer to Large system terminal and modem guidelines on page 23 for further information.

Large system terminal and modem guidelines

Each Call Processor Card provides a Data Terminal Equipment (DTE) port at J21 and a data communication equipment (DCE) port at J25 on the Core and Core/Network Module I/O panel. The designations DTE and DCE refer to the function of the port, not the type of device that connects to the port. Therefore, a modem (which is DCE) connects to the DTE port at J21, and a terminal (which is DTE) connects to the DCE port at J25.

The input/output ports on the CP card (CPSI ports) are used to access the Core or Core/ Network Module, which houses the card. The CPSI ports are active only when the Core associated with the CP card is active. Therefore, the CPSI ports should not be used as the only I/O connection for the system.

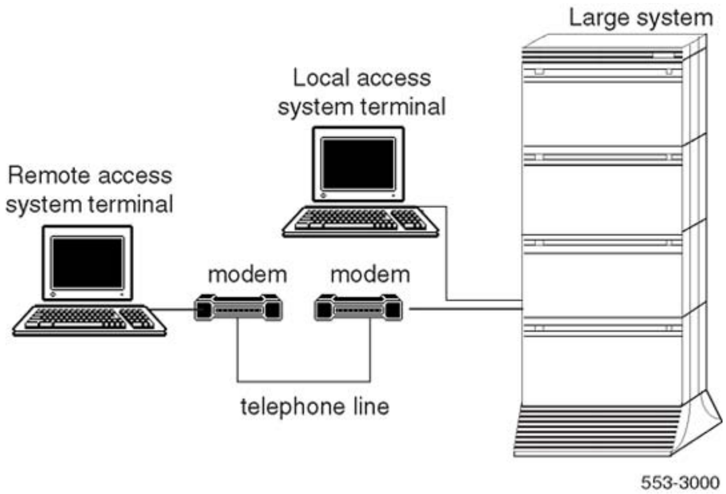

Figure 1: Local and remote access to a system terminal

For correct operation, terminals used with large systems must be set to 9600 baud, 7 data, space parity, one stop bit, full duplex, XON.

Figure 2: Modem to a switch box and SDI and CPSI ports on page 25 shows the recommended configuration for remote maintenance monitoring the system. In this configuration, a switch box is normally set to the SDI port to remotely monitor general system operation. The CPSI ports can be accessed for debugging and patch downloading (through your Avaya representative).

See "Large system terminal and modem connections" in *Avaya Communication Server 1000M and Meridian 1 Large System Installation and Commissioning (NN43021-310)* for detailed information about configuring and connecting terminals and modems with large systems. The A0377992 Black Box ABCDE-Switch, A0381391 UDS FastTalk modem, and cables required for the configuration are available through Avaya.

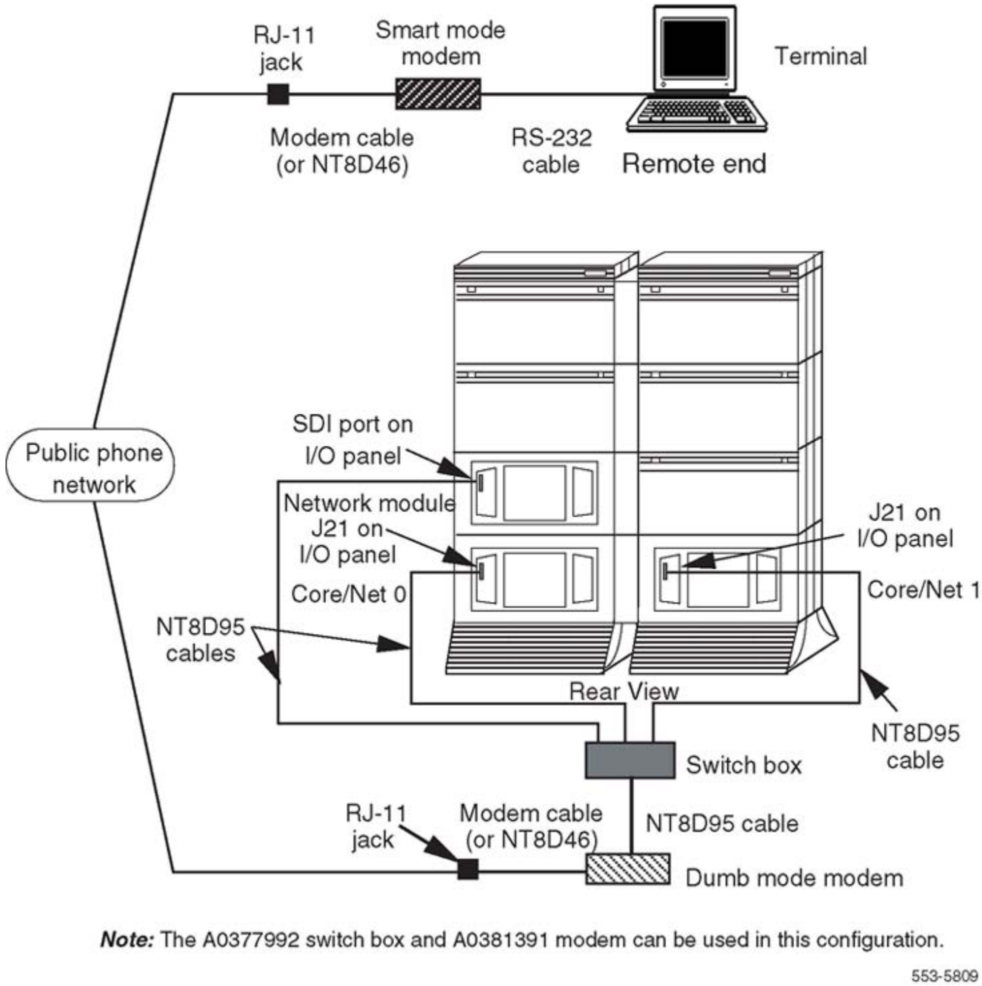

Figure 2: Modem to a switch box and SDI and CPSI ports

Modems must meet the following required specifications to be compatible with the system. Modems that meet the following recommended specifications must also meet the required specifications.

- Required: true, not buffered, 9600 baud support (required for remote technical support)
- Required: CCITT V.32 or V.32bis compliance
- Recommended: the ability to adjust to lower and higher speeds, depending on line quality, while maintaining 9600 baud at local DTE
- Recommended: V.42 error correction
- Recommended: V.42bis data compression

The following models are tested and verified as compatible with the system:

- Hayes V-series ULTRA Smartmodem 9600
- Motorola 28.8 Data/Fax modem

- UDS FastTalk V.32/42b (available through Avaya)
- US Robotics Courier HST Dual Standard V.32bis

A dispatch or call back modem, normally connected to the SDI port, can be used if it meets the requirements listed above. To use a modem of this type that does not meet the requirements, the modem can only be used in addition to a modem that does meet specifications.

Message format

Through the system terminal, enter commands that tell the system to perform specific tasks; the system performs the tasks and sends messages back to the system terminal, indicating status or errors. System messages, along with indicators such as maintenance display codes and Light Emitting Diode (LED) indicators, identify faults in the system.

System messages are codes with a mnemonic and number, such as PWR0014. The mnemonic identifies an overlay program or a type of message. The number identifies the specific message. Table 2: System message format on page 26 gives an example of the format for a system message.

Table 2: System message format

System message: PWR0014	Interpretation
PWR	Generated by the system monitor. Indicates power and temperature status or failures.
0014	The system monitor failed a self-test.

System messages generated from the Core Common Equipment Diagnostic (LD 135) and the Core Input/Output Diagnostic (LD 137) include the interpretation and action required. For example, if a CPU test from LD 135 fails, the message displayed is "CCED200 CPU test failed Check the CP card."

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all Maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for the interpretation of all system messages.

Maintenance telephone

A telephone functions as a maintenance telephone when the class of service is defined as Maintenance Set Allowed (MTA) in the Multiline Telephone Administration program (LD 11). A maintenance telephone allows commands to be sent to the system through the following maintenance overlays: LD 30, LD 32, LD 33, LD 34, LD 35, LD 36, LD 37, LD 38, LD 41, LD 42, LD 43, LD 45, LD 46, LD 60, LD 61, and LD 62.

The Core Common Equipment Diagnostic (LD 135) and Core I/O Diagnostic (LD 137) are among the overlays that cannot be accessed through a maintenance telephone.

Tones and outpulsing can be tested through the maintenance telephone. Specific commands for tone testing are given in the Tone and Digit Switch and Digitone Receiver Diagnostic (LD 34).

To enter commands on a maintenance telephone, press the keys that correspond to the letters and numbers of the command (for example, to enter LD 42 return, key in 53#42##). The following table shows the translation from a terminal keyboard to a telephone dial pad.

Table 3: Translation from keyboard to dial pad

Keyboard		Dial pad
	1	1
A B C	2	2
D E F	3	3
G H I	4	4
J K L	5	5
M N O	6	6
P Q R S	7	7
T U V	8	8
W X Y Z	9	9
	0	0
	Space or #	#
	Return	##

Access through the maintenance telephone

1. Press the prime DN key.
2. Place the set in maintenance mode by entering

`xxxx91`	"xxxx" is the customer Special Prefix (SPRE) number. Define SPRE in the Customer Data Block and print it in LD 21. The SPRE number is typically "1" (which means you would enter 191).

3. To check for busy tone, enter "return":

   ##

   a. If there is no busy tone, go to step 5 on page 22.

b. If there is a busy tone, a program is active. To end an active program and access the system enter

****

4. Load a program:

`53#xx##`	"xx" represents the number of the program

5. Perform tasks.
6. Enter ******** to exit the program and return the telephone to call processing mode. Background routines are then loaded automatically.

Chapter 5: How to clear faults

Contents

This section contains information on the following topics:

Fault clearing process

When a fault must be cleared in the system, follow these steps:

- Observe and record all fault indicators. For accountability and future reference, manually log all cleared faults in a maintenance journal.
- System messages, visual fault indicators, maintenance display codes, and user reports identify problems. If the indicators are not current or seem incomplete, print the History File for previous messages, or initialize the system for information on the current status, or do both.
- Look up maintenance display codes and system messages in *Avaya Software Input Output Reference – System Messages (NN43001-712)*. The interpretation of the message or code may identify faulty equipment and indicate corrective action to clear the problem. If you cannot clear the fault through information in this guide, follow the process in this document. See Using this document on page 30.
- Test and enable disabled equipment.
- It may be possible to hardware-re-enable circuit cards by unseating and reinstalling them. It may be possible to software-re-enable cards by disabling and re-enabling them. When the cause of a fault is not evident, a software test can help identify the problem.
- Replace equipment as necessary.

  When identifying faulty equipment, follow procedures in this document. When the fault is corrected, follow the instructions in Final maintenance procedure on page 145 to completely restore normal operation.

Using this document

To use the information in this document, follow the steps below:

1. Classify the fault by the indicators present (See Fault indicators on page 30). When multiple faults are indicated, clear them in the following order:
   - Power faults, Clearing power faults on page 35
   - Common equipment faults, How to clear faults on page 29
   - Network equipment faults, How to clear faults on page 29
   - Peripheral equipment faults, Clearing peripheral equipment faults on page 75
   - Trunk faults, Clearing trunk faults on page 83
   - Attendant console faults, Clearing attendant console faults on page 89
   - Telephone faults, Clearing telephone faults on page 95

   Always clear possible power faults and then common equipment faults before any other type of fault.
2. Go to the chapter for clearing the type of fault identified. There is a chapter for each type of fault listed above. As closely as possible, match the problem to a symptom listed at the beginning of the chapter.
3. Go through the procedure for clearing each possible cause of the problem until the fault is cleared.
4. When the fault is corrected, follow the instructions in Final maintenance procedure on page 145 to completely restore normal operation.

Fault indicators

A fault in the system can be indicated by any combination of the following:

- system messages
- visual fault indicators
- maintenance display codes
- user reports

Each type of indicator is described below.

System messages

System messages are codes with a mnemonic and number, such as PWR0014. The mnemonic identifies a software program or a type of message. The number identifies the specific message. Use system messages with other indicators, such as maintenance display codes and visual indicators, to identify and clear faults.

Table 4: System message fault indicators and related fault types on page 31 lists the most common fault indicating messages and the type of fault they indicate. For a complete list and interpretation of system messages, see the *Avaya Software Input Output Reference – System Messages (NN43001-712)*.

Table 4: System message fault indicators and related fault types

System messages	Type of fault
BSD090 PWR messages	Power
BSD080, 085, 086, 103 CED messages CIOD, CMON, and CNI messages INI001, 002, 004, 005 IOD006, 007, 060, 061, 291–297 NWS030, 102, 103, 142 SYS messages	Common equipment
BSD081, 101, 110, 111, 121, 130, 201–203, 205–209, 600, 602 CNF messages DTA, DTC, DTI messages ERR020, 120, 4060 INI003, 007–012 NWS101, 141, 201–204, 301, 401 OVD021, 022, 023, 031 TDS messages XMI messages	Network equipment
BSD301, 401, 402 ERR4062 NWS301, 401, 501 OVD001–010, 024 XMI messages	Peripheral equipment
ERR090, 220, 270 OVD003, 008, 009, 010 TRK messages	Trunk
BSD501	Attendant console
BSD501	Telephone

System messages	Type of fault
ERR500 MWL500 NWS501 OVD001–002, 004, 005 XMI messages	

Visual fault indicators

There are visual indicators on the system that can help identify faults. These indicators include:

- a major or minor alarm display on the attendant console: indicates a possible power, common equipment, or network equipment fault
- circuit card light emitting diodes (LEDs): indicate that a card or a unit on a card is disabled
- column LED: indicates a fault in the column

Table 5: Visual system fault indicators on page 32 lists visual indicators you may see and the types of faults they indicate.

Table 5: Visual system fault indicators

Indicator	Type of fault
Major alarm on attendant consoles Red LED lit on column top cap Green LED off on module power supply Circuit breaker tripped (down) Remote alarm	Power
Major alarm on attendant consoles Red LED lit on CE card (other than the CPU interface card on the non-active CPU)	Common equipment
Minor alarm on an attendant console Red LEDs lit or flashing on associated cards	Network equipment
Red LED lit on associated card	Peripheral equipment
Red LED lit on trunk card	Trunk
Red LED lit on associated cards	Attendant console
Red LED lit on associated cards	Telephone

Maintenance display codes

Maintenance displays are located on the faceplate of some circuit cards. A maintenance display shows an alphanumeric code that can indicate the status of the system and aid in fault identification (NT8D01 XPEC cards display either alphanumeric or binary using individual

LEDs). Interpretations of the maintenance display codes are listed in *Avaya Software Input Output Reference – System Messages (NN43001-712)*.

Each new code shown on a maintenance display overwrites the one before it. However, all codes received on common equipment displays are recorded. Review the codes by printing the History File. The most recent 16 codes displayed on an NT8D01 Controller Card stay in memory. Review the codes and reset the counter through the Network and Signaling Diagnostic (LD 30). Examine previous codes, system messages, and visual indicators with the current maintenance display code to properly analyze faults.

Table 6: Maintenance display locations and related fault types on page 33 lists the cards with maintenance displays and the type of fault they might indicate.

Table 6: Maintenance display locations and related fault types

Maintenance display	Type of fault
NT8D01 Controller Card NT1P62 Fiber Controller Card NT7R52 Remote Carrier Interface Card	Peripheral equipment

User reports

Many faults reported by users, such as a damaged telephones or data sets, are obvious and can be fixed by replacing the damaged equipment.

Some faults are less obvious and may be caused by other equipment, such as a defective peripheral equipment line or trunk card. To classify the fault in these cases, check for system messages and visual fault indications. It may be necessary to the user reproduce the problem to determine the sequence of events that led to the fault.

Table 7: User reported problems and related fault types on page 33 lists problems users typically report.

Table 7: User reported problems and related fault types

User report	Type of fault
Major alarm reported by attendant No ring on analog (500/2500-type) telephones	Power
Major alarm reported by attendant	Common equipment
Minor alarm reported by attendant Cannot transfer or conference Cannot dial out on 500/2500 telephones	Network equipment
Trouble with calls on attendant console Trouble with calls on analog (500/2500-type) telephones	Peripheral equipment

User report	Type of fault
Trouble with calls on digital telephones	
Trouble with a specific trunk Continuous ringing Trouble with calls on console and/or telephones	Trunk
Trouble with calls Trouble with equipment (such as handset, headset, or display)	Attendant console
Trouble with calls Trouble with equipment (such as handset or add-on module)	Telephone

Chapter 6: Clearing power faults

Contents

This section contains information on the following topics:

Power faults

Various electrical voltages are required. These electrical voltages are developed and delivered by the power equipment system. Cooling and monitoring devices are interconnected with the power system. Figure 3: Internal DC power equipment on page 36 shows power, cooling, and monitoring equipment that may be located in a column, including:

- air probe: increases the impeller speed as the temperature goes up
- blower unit: provides cooling for the column
- Module Power Distribution Unit (MPDU): houses circuit breakers for some module power supplies
- In DC-powered systems, there is a switch on each power supply, so MPDUs are not required.
- Power Distribution Unit (PDU): distributes power from the external source to module power supplies and houses the column circuit breaker(s)
- module power supply: converts voltage from the PDU to the voltages needed in each type of module
- ringing generator: provides current to ring analog (500/2500-type) telephones and to light the message waiting light on the 2500 telephones
- system monitor: monitors power and temperature conditions
- thermostat: monitors column temperature

Power faults can disable ringing for analog (500/2500-type) telephones, message waiting lights on 2500 telephones, all the cards in a module, all the modules in a column, or the entire system.

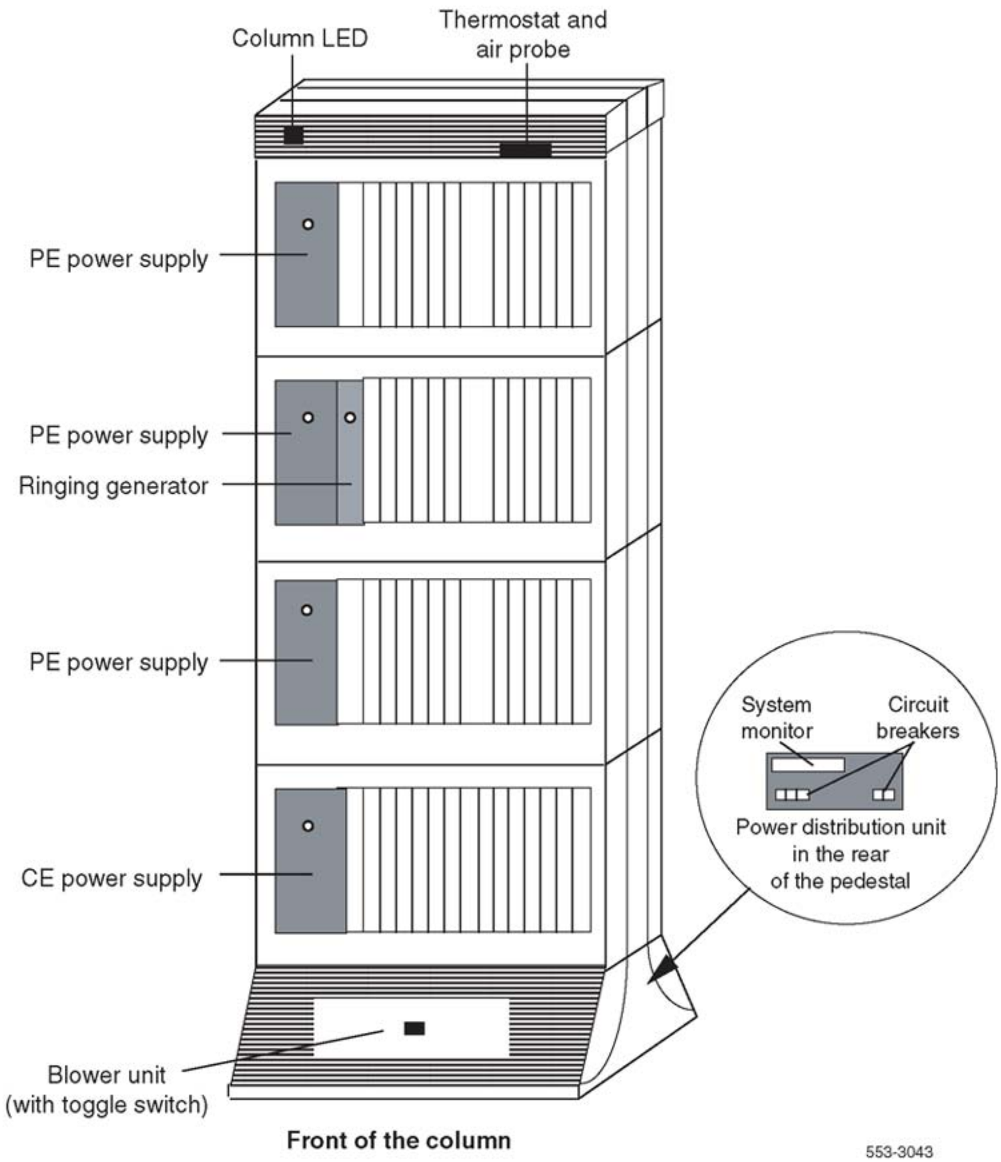

Figure 3: Internal DC power equipment

Fault clearing procedures

System messages with the mnemonic PWR (power) contain four fields of information about power equipment. These fields identify the type of equipment indicated (such as the blower unit) and the source of the message (system monitor, module, or module power supply) in PWR messages. Table 8: PWR message fields on page 37 defines the fields. Figure 4: Power equipment destinations on page 38 shows the power equipment identified in PWR messages.

Table 8: PWR message fields

PWRxxxx (HW) (SM) (UEM) (U)			
HW	Hardware type, one of the following:		
		CRBK	Circuit breaker
		DCSP	DC power supply
		FANU	Blower unit
		PFTC	Power fail transfer
		PWSP	Module power supply, including ringing generator
		THSW	Thermal switch
		UPSA	Uninterruptible Power Supply (UPS) alarm
		XSMC	System monitor card
SM	System monitor (0-63) generating the message (0 is the master system monitor)		
UEM	Module (0-3) reporting the condition		
U	Number of the power supply (1-2) in the module		

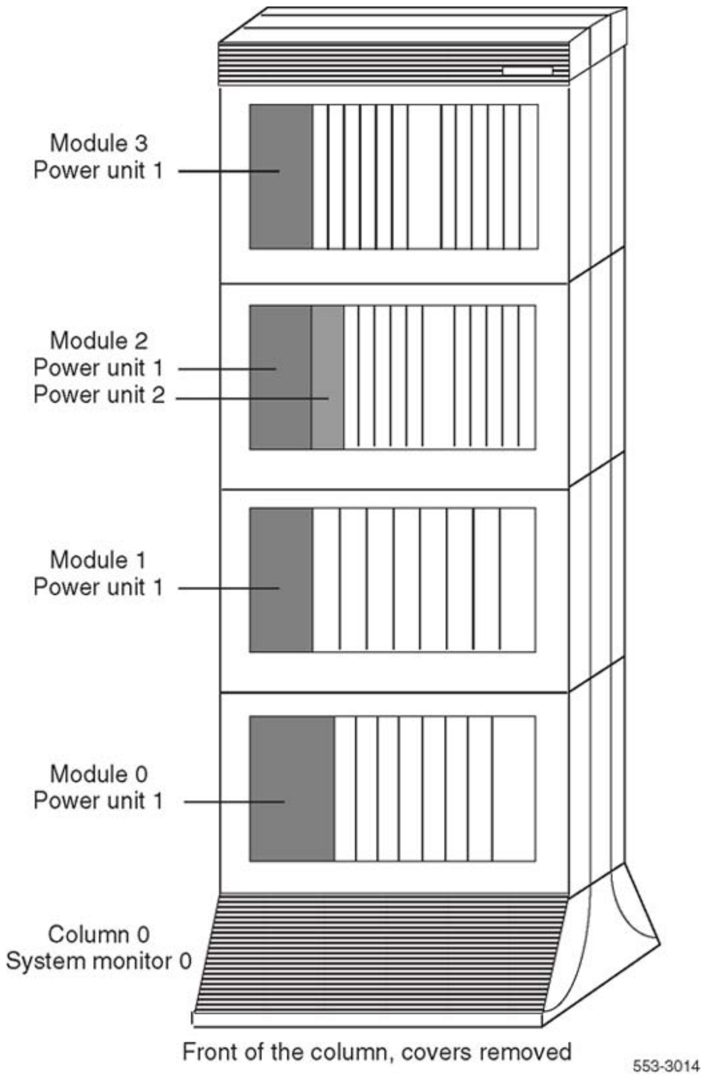

Figure 4: Power equipment destinations

Table 9: Power fault indicators on page 38 lists common power fault indications.

Table 9: Power fault indicators

Indicator	Possible indications
System messages	BSD090 (Program has detected a power fault indication. Check PWR messages.) PWR messages
Visual indicators	Major alarm on attendant consoles Red LED lit on column top cap Green LED off on module power supply LED lit on PFTU Circuit breaker tripped (down) Remote alarm

Indicator	Possible indications
User reports	Major alarm reported by attendant No ring on 500/2500 telephones

Warning:

Modules covers are not hinged. Do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Symptom: Circuit breakers and all column LEDs off (DC power)

All the LEDs in a column are off and all circuit breakers on the PDU are tripped. Message PWR0004 may be received, which indicates that the circuit breakers for the column are tripped. See "PWR" in the *Avaya Software Input Output Reference – System Messages (NN43001-712)* and use this procedure to clear the problem.

High room temperature can shut down the system. If all columns in a multicolumn system are shut down, check for this external condition. It may be necessary to replace one of the following:

- Air filter: P0699798
- Air probe harness: NT8D46AM
- System monitor cables
- Thermostat harness: NT8D46AC

Possible cause	Action
Low batteries	If a TRIP signal to the system has shut down power: • Check the cable from the external power system. • Check the batteries and service them as necessary.
Short circuit or damage	Look for signs of damage (such as smoke, burnt contacts, or melted insulation) that may be caused by a short circuit or misplaced equipment. If a problem of this type is not found, go to the next possible cause.
Thermal overload	Make sure nothing is blocking ventilation throughout the system. Allow the system to cool for a few minutes and then reset the breakers.
	If the breakers trip immediately, check the thermostat harness: • Make sure the harness is securely connected to the module below it. • Use an ohmmeter to check the connector pins for the harness; if there is an open circuit between pins 3 and 4 or between pins 5 and 6, replace the harness.

Possible cause	Action
	If the breakers do not trip immediately, check the air filter: • If the filter is dirty and undamaged, clean the filter as described in Routine maintenance on page 183. • If the filter is damaged in any way, replace the filter as described in Replacing equipment on page 187. If there is no problem with the air filter, or if the breakers trip when reset, check the air probe harness: • Make sure the harness is securely connected to the module below
Defective connection to system monitor	Make sure cables to connectors J5 and J6 are securely connected to the system monitor in the column. Check the system monitor connections to each module. If the breakers trip with all cables connected, replace the cables one at a time until the breakers stay on.

Symptom: Circuit breakers on but all column LEDs off (DC power)

All the LEDs in a column are off but the circuit breakers on the PDU are not tripped. Use this procedure to clear the problem. It may be necessary to replace one of the following:

- External rectifier
- PDU

Possible cause	Action
DC wires not connected	If the DC wires are disconnected, connect them. If the wires are already connected or if the column LEDs do not light when they are connected, go to the next possible cause.
Warning: The following test is performed on a live power connection.	
No power at DC source	Make sure the rectifier is on and connected. Make sure the rectifier is receiving power. If there is no problem with the rectifier, go to the next possible cause.
Defective power cable	With a meter, test the field wiring connections in the PDU for DC power. If there is no power, replace the cable. If there is power at the connections, go to the next possible cause.
Defective PDU	Replace the PDU.

Symptom: Green LED off on module power supply (DC power)

The green LED is off on one of the following power supplies:

- IPE power supply: NT6D40
- CE power supply: NT6D41
- Ringing generator: NT6D42
- CE/IPE power supply: NT6D43

A system message may be received indicating the status of the power supply. See "PWR" in the *Avaya Software Input Output Reference – System Messages (NN43001-712)* and use this procedure to clear the problem.

Possible cause	Action
Disconnected power cable	Check the power cable connection to the power supply. If the cable is connected, check power cable connections to each module below the affected one (see Figure 5: DC power cabling in rear of column on page 42). If all power cables are connected, go to the next possible cause.
Defective power supply	Set the switch on the power supply to OFF (down), wait at least 60 seconds, and then set the switch back to ON (up). If the LED on the power supply is still off, replace the power supply.

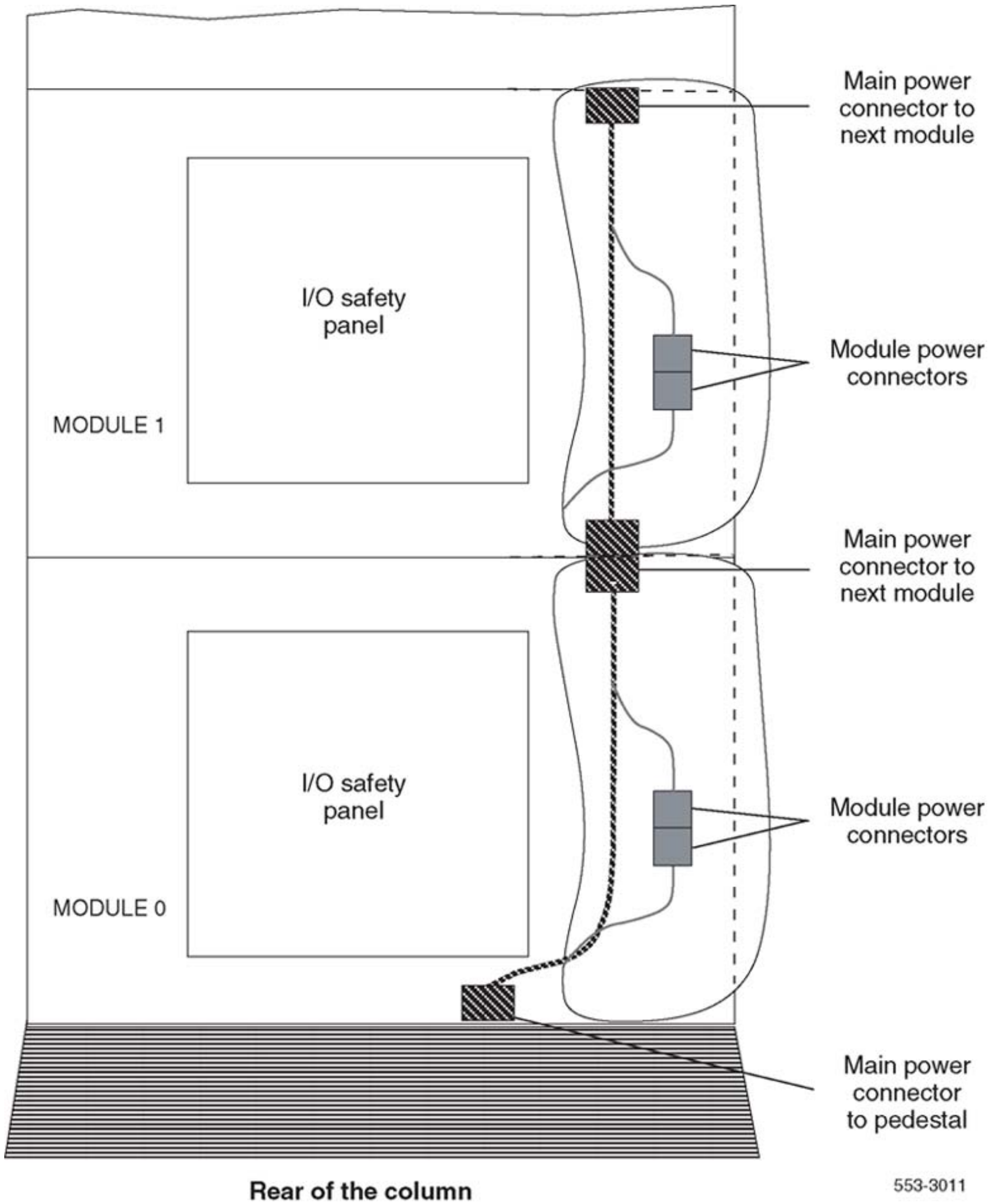

Figure 5: DC power cabling in rear of column

Symptom: Defective blower unit indicated (DC power)

The blower unit circuit breaker (breaker number 5 on the PDU) is tripped and trips when reset. A system message may be received indicating that there is a failure in the blower. See "PWR" in the *Avaya Software Input Output Reference – System Messages (NN43001-712)* and use this procedure to clear the problem. It may be necessary to replace one of the following:

- Pedestal Blower Unit DC: NT8D52DD
- PDU

Possible cause	Action
Blower unit switch turned off	Set the switch on the front of the blower unit to ON (right). Reset the circuit breaker. If the switch was already on or if the circuit breaker trips again, go to the next possible cause.
Defective blower unit	Replace the blower unit and set the circuit breaker to on. If the breaker trips, go to the next possible cause.
Defective PDU	Replace the PDU.

Symptom: Main circuit breaker and all column LEDs off (AC power)

All the LEDs in a column are off and the main circuit breaker on the PDU is tripped. Message PWR0004 may be received, which indicates that the main circuit breaker for the column is tripped. See "PWR" in *Avaya Software Input Output Reference – System Messages (NN43001-712)* and use this procedure to clear the problem.

High room temperature or a power surge can shut down the system. If all columns in a multicolumn system are shut down, check for these external conditions. It may be necessary to replace one of the following:

- Cooling Unit Filter Assembly: P0699798
- Air probe harness: NT8D46AM
- System monitor cables
- Thermostat harness: NT8D46AC

Possible cause	Action
Short circuit or damage	Look for signs of damage (such as smoke, burnt contacts, or melted insulation) that may be caused by a short circuit or misplaced equipment. If a problem of this type is not found, go to the next possible cause.
Thermal overload	Make sure nothing is blocking ventilation throughout the system. Allow the system to cool for a few minutes and then reset the breaker. If the breaker trips immediately, check the thermostat harness:

<table>
<tr><th>Possible cause</th><th>Action</th></tr>
<tr><td></td><td>• Make sure the harness is securely connected to the module below it.
• Use an ohmmeter to check the connector pins for the harness; if there is an open circuit between pins 3 and 4 or between pins 5 and 6, replace the harness.
If the breakers do not trip immediately, check the air filter:
• If the filter is dirty and undamaged, clean the filter as described on Routine maintenance on page 183.
• If the filter is damaged in any way, replace the filter as described on Replacing equipment on page 187.</td></tr>
<tr><td></td><td>If there is no problem with the air filter or if the breaker trips when reset, check the air probe harness:
• Make sure the harness is securely connected to the module below it.
• Use an ohm meter to check the connector pins for the harness; if there is an open circuit between pins 1 and 2, replace the harness.
If there is no problem with this equipment, go to the next possible cause.</td></tr>
<tr><td>Defective connection to system monitor</td><td>Make sure cables to connectors J5 and J6 are securely connected to the system monitor in the column.
Check the system monitor connections to each module.
If the breaker trips with the cables connected, replace the cables one at a time until the breaker stays on.</td></tr>
</table>

Symptom: Main circuit breaker on but all column LEDs off (AC power)

All the LEDs in the column are off but the main circuit breaker on the PDU is not tripped. Use this procedure to clear the problem. It may be necessary to replace one of the following:

- PDU: NT8D53AB
- Main power cord
- UPS

Possible cause	Action
Power cord not connected	If the power cord for the column is unplugged, plug it in. If the power cord is already plugged in or if the column LEDs do not light when it is plugged in, go to the next possible cause.

Possible cause	Action
Warning: The following tests are performed on a live power connection.	
No power at outlet	With a meter or test lamp, test for AC power at the outlet. If there is no power at the outlet when AC power is supplied through a UPS unit, repair or replace the UPS following the manufacturer's instructions. If there is no power at the outlet when AC power is supplied through commercial service (not through a UPS), take the necessary steps to the commercial power restored. If there is power at the outlet, go to the next possible cause.
Defective power cord	With a meter or test lamp, test the field wiring connections in the PDU for AC power. If there is no power, replace the power cord. If there is power at the connections, go to the next possible cause.
Defective PDU	Replace the PDU.

Symptom: Breaker off on MPDU (AC power)

A circuit breaker on a MPDU is tripped and trips when reset. The green LED is off on the associated power supply:

- NT8D56AA single breaker MPDU: for NT8D29 CE Power Supply
- NT8D57AA dual breaker MPDU: for NT8D06 IPE Power Supply and NT8D21 Ringing Generator

A system message may be received indicating the status of the breaker. See "PWR" in *Avaya Software Input Output Reference – System Messages (NN43001-712)* and use this procedure to clear the problem.

Possible cause	Action
Short circuit or damage	Look for signs of damage (such as smoke, burnt contacts, or melted insulation) that may be caused by a short circuit or misplaced equipment. If a problem of this type is not found, go to the next possible cause.
Defective module power supply (single breaker)	Unseat the associated power supply and reset the breaker. If the breaker does not trip, replace the power supply. If the breaker trips, replace the MPDU.
Defective module power supply (dual breaker)	If one circuit breaker is tripped on a dual MPDU: Unseat the associated power supply (see Figure 6: Dual circuit breaker and associated module power supplies on page 46) and then reset the breaker.

Possible cause	Action
	If the breaker does not trip, replace the power supply. If the breaker trips, replace the MPDU.
	If both circuit breakers are tripped: Unseat both power supplies, and then reset the breakers. If either breaker or both breakers trip, replace the MPDU. If the breakers do not trip, set them to OFF (down): Reinsert one power supply and reset the associated breaker. If the breaker trips, replace that power supply. If the breaker does not trip, set the breaker to OFF and unseat that power supply. Reinsert the other power supply and reset the associated breaker. If the breaker trips, replace that power supply.

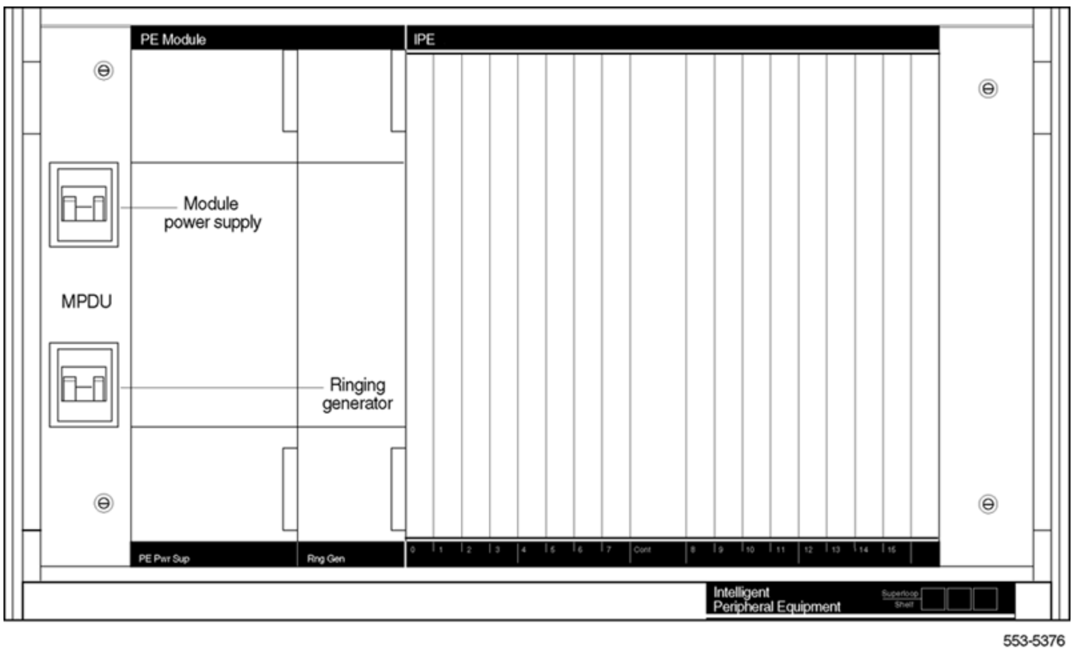

Figure 6: Dual circuit breaker and associated module power supplies

Symptom: Green LED off on module power supply (AC power)

The circuit breaker on the associated MPDU is not tripped, but the green LED is off on one of the following power supplies:

- IPE power supply: NT8D06
- CE/IPE power supply: NT7D14
- Ringing generator: NT8D21
- CE power supply: NT8D29

A system message may be received indicating the status of the power supply. See "PWR" in *Avaya Software Input Output Reference – System Messages (NN43001-712)* and use this procedure to clear the problem.

Possible cause	Action
Disconnected power cable	Check the power cable connection between the power supply and the back of the MPDU. If the cable is connected, check power cable connections to each module below the affected one (see Figure 7: AC power cabling in rear of column on page 48). If all power cables are connected, go to the next possible cause.
Defective power supply	Set the circuit breaker on the associated MPDU off and then on (see Figure 6: Dual circuit breaker and associated module power supplies on page 46 if there are dual circuit breakers). If the LED on the power supply is still off, replace the power supply. If the power supply is replaced, the LED on the replacement should light and stay lit. If it does not, go to the next possible cause.
Defective MPDU	Replace the MPDU.

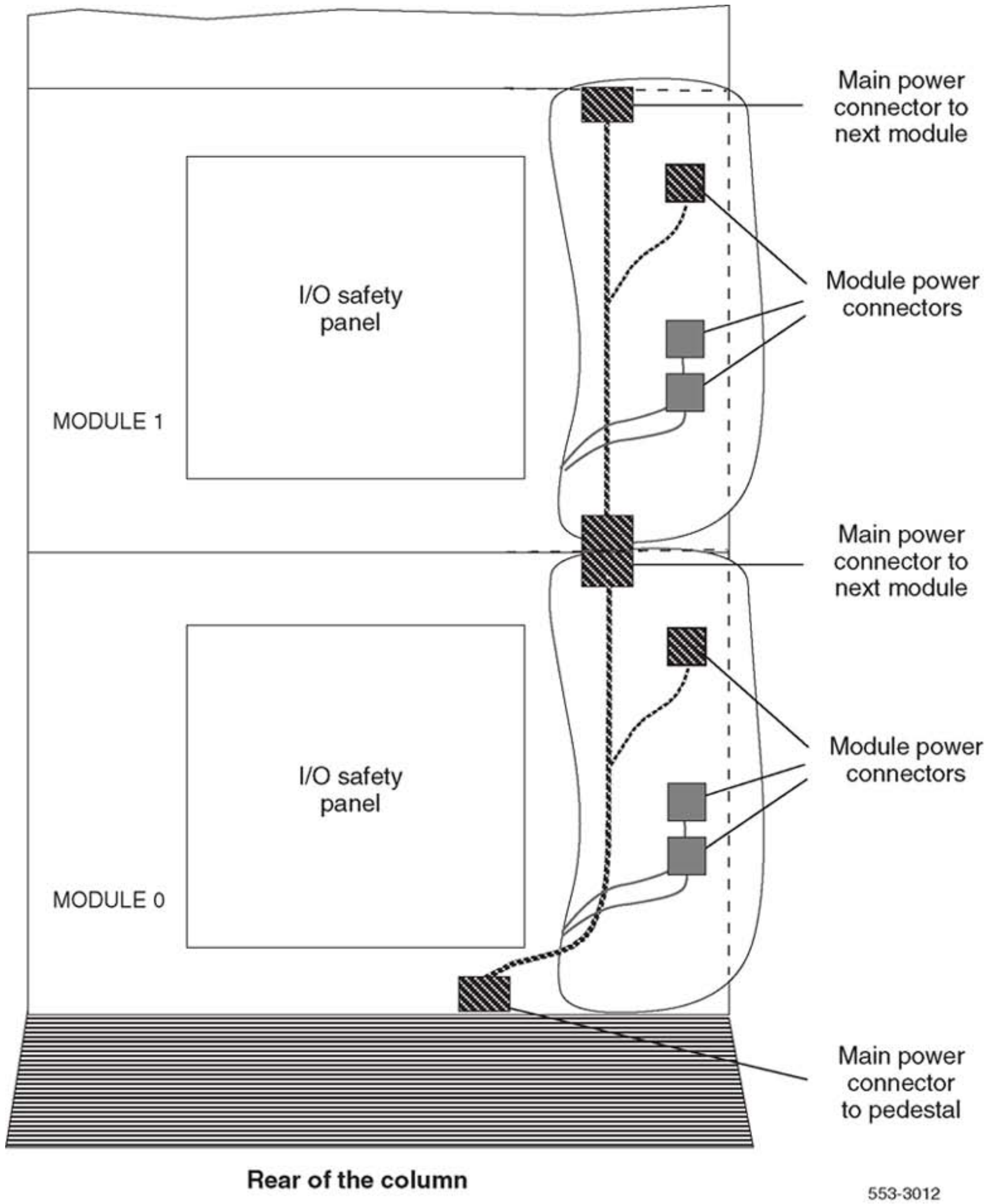

Figure 7: AC power cabling in rear of column

Symptom: Defective blower unit indicated (AC power)

The blower unit circuit breaker (located on the front of the unit) is tripped and trips when reset. A system message may be received indicating that there is a failure in the blower. See "PWR" in *Avaya Software Input Output Reference – System Messages (NN43001-712)* and use this procedure to clear the problem. It may be necessary to replace one of the following:

- Blower unit: NT8D52AB
- PDU: NT8D53

Possible cause	Action
Defective blower unit	Replace the blower unit and set the circuit breaker to ON (up). If the breaker trips, go to the next possible cause.
Defective PDU	Replace the PDU.

Candeo power systems

Candeo power systems are based upon modular building blocks (rectifiers, System Manager, DC distribution, and battery connection modules) and designed to power -48 V DC applications. There are two types of Candeo systems: Large Candeo, which uses 50 A rectifiers and has a capacity of 1000 A, and Small Candeo (SP48300), which uses 30 A rectifiers and has a capacity of 300 A. The Candeo interfaces with the system through the Candeo's System Manager alarm output ports.

The Large Candeo System Manager produces a Major Alarm for the following faults:

- High voltage shut down (HVSD)
- High voltage (HV)
- Battery on discharge (BOD)
- Low voltage (LV)
- Low voltage disconnect (LVD)
- Alarm busy supply (ABSF)
- Internal fuse alarm (INT FA)
- Fuse alarm (FA)
- Rectifier fail alarm (RFA)

The Small Candeo (SP48300) System Manager produces a Major Alarm for the following faults:

- Battery fuse alarm
- High battery temperature
- High voltage shutdown (HVSD)
- Main AC fail

- Rectifier fail major (RFA major)
- Low voltage disconnect (LVD)
- High voltage (HV)
- Fuse alarm (FA)
- Priority low voltage disconnect
- AC input over voltage
- Rectifier AC fail
- Remote shutdown
- System Manager SP fail
- Configuration fail
- Battery on discharge (BOD)
- Low voltage (LV)
- Very high battery temperature

For information about clearing alarms on the Candeo power systems, refer to the *Candeo Power Systems User Guide* (P0914425) and *Candeo SP 48300 Power System AP6C55AA User Manual* (P7000154).

Chapter 7: Clearing common equipment faults

Contents

This section contains information on the following topics:

Common equipment faults

Common equipment (CE) functions perform system control and switching. Common equipment can include:

- Bus Terminating Unit (BTU): provides logical termination to CPU and network buses
- Central Processing Unit (CPU): performs system call processing functions
- Call Processor (CP): performs system arithmetic and logic functions
- Data cartridge: allows access to software packages purchased
- Mass Storage Interface card (floppy disk interface card, mass storage interface card, or enhanced mass storage interface card): interface between the CPU and the mass storage unit
- Mass Storage Unit (floppy disk unit, multi drive unit, or core multi disk unit): provides a backup for programs and data stored in system memory
- Read Only Memory (ROM) card: provides memory for the CPU on the NT6D66 Call Processor
- Serial Data Interface (SDI) card: provides ports between the CPU and external devices
- Core to Network Interface (CNI) card: links the CE bus with the three-port extender (3PE) card(s) in the network slots
- Three-Port Extender (3PE) card: extends CPU signals to the network, and between Core Network Interface (CNI) and the network.

Common equipment faults can disable the CPU or the mass storage unit and stop call processing. In addition, other types of equipment (such as network equipment) may not operate properly while there is a CE fault in the system.

Look up all system messages and maintenance display codes in *Avaya Software Input Output Reference – System Messages (NN43001-712)* and follow the instructions given. If the fault does not clear, use the following procedures. Take any action indicated by the maintenance display codes. Continually observe and look up system messages while performing the procedure.

Fault clearing procedures

The following table lists common equipment fault indications. Refer to How to clear faults on page 29 for complete fault clearing process.

Table 10: Common network fault indicators

Indicator	Possible indications
System messages	BSD080, 085, 086, 103 CED messages INI001, 002, 004, 005 IOD006, 007, 060, 061, 291–297 NWS030, 102, 103, 142 SYS messages
Visual indicators	Major alarm on attendant consoles Red LED lit on column top cap Red LED lit on CE card of active CPU
Maintenance displays	QPC580 CPU Interface NT8D19 Memory/Peripheral Signaling QPC584 Mass Storage Interface NT9D34 Enhanced Mass Storage Interface QPC742 Floppy Disk Interface NTND01 ICM card NTND10 CMA card NT6D66, NT9D19, NT5D10 Call Processor NT6D63 IOP card NT5D61 IODU/C card
User reports	Major alarm reported by attendant

Warning:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Symptom: Fault indicated on a common equipment card

The red LED is lit or the display is indicating a fault on a common equipment card. The dual Core system is still operating but may be limited to one CP. Make sure the normal/maintenance switch on both Call Processor cards is set to Norm.

For information about switch settings for the applicable Core cards, see *Avaya Circuit Card Reference (NN43001-311)*. It may be necessary to replace one of the following:

- CP card
- CP to CP cable: NTND11
- IODU/C card: NT5D61
- IOP card: NT6D63
- CNI card: NT6D65
- 3PE card: QPC441
- CBT card: NT6D6003

cPCI Core/Network Card Cage AC/DC: NT4N46AA

Possible cause	Action
Defective serial I/O ports	Check each SDI port by entering: `LD 37 STAT TTY` If software is disabled, try to enable it (software-disable, hardware-disable, and re-enable). If the card does not enable, replace it. If the CPU is still faulty, go to the next possible cause.
Defective IOP card	Check the IOP card: Reinstall the IOP card, test it, and enable it: `LD 137 DIS IOP TEST IOP ENL IOP ****` If the CPU is still faulty, go to the next possible cause.

Defective CE card (lit LED)	Unseat the CP and CNI cards and reinstall them. Make sure all cables are securely connected. If all cards do not recover, continue with this procedure.
	If the display on the CP card shows a fault:
	`LD 135 TEST CPU`
	If there is a problem with the test, CCED system messages are generated.
	If the LED is lit on some other CE card, check the CNI card, enter:
	`LD 135 TEST CNI c s`

Possible cause	Action
	• *c* represents the CPU 0 or 1 and • *s* represents the card slot. If the CPU is still faulty, replace the CE cables one at a time. If CNI is faulty, disable the card before outing it. If the CPU remains faulty, go to the next possible cause.
Defective backplane	Replace the card cage assembly in the module. To replace the card cage, first switch the system to the alternate CPU and then disable and remove all the cards in the card cage to be replaced.
Defective serial I/O ports	Check each SDI port by entering: `LD 37 STAT TTY` If software is disabled, try to enable it (software-disable, hardware-disable and then re-enable). If the card does not enable, replace it. If the CPU is still faulty, go to the next possible cause.
Defective IOP card	Check the IOP card: Reinstall the IOP card, test it, and enable it: `LD 137 DIS IOP TEST IOP ENL IOP ****` If the CPU is still faulty, go to the next possible cause.

Defective CE card (lit LED)	Unseat the CP and CNI cards and reinstall them. Make sure all cables are securely connected. If all cards do not recover, continue with this procedure.
	If the display on the CP card shows a fault:
	`LD 135 TEST CPU`
	If there is a problem with the test, CCED system messages are generated.
	If the LED is lit on some other CE card, check the CNI card. Enter:
	`LD 135 TEST CNI c s`
	• *c* represents the CPU 0 or 1 and
	• *s* represents the card slot.
	If the CPU is still faulty, replace the CE cables one at a time.
	If CNI is faulty, disable the card before you out it.
	If the CPU remains faulty, go to the next possible cause.

Symptom: Floppy disk unit not operating

There may be a lit LED on the Floppy Disk Unit (FDU). There may be a maintenance display code on the Floppy Disk Interface (FDI) card indicating a problem with the FDU. For information about switch settings, see *Avaya Circuit Card Reference (NN43001-311)*. It may be necessary to replace one of the following:

- Cable between FDU and FDI card
- Security Data cartridge: QMM42
- FDI card: QPC742
- FDU: NT8D68 or NTND15

Possible cause	Action
Defective FDI card or data cartridge	Unseat the FDU and FDI cards and reinstall them. Make sure the cable between the FDU and FDI is securely connected. (In a dual CPU system, check both FDI cards.) If the FDU does not recover, continue with this procedure. Check the FDI: Make sure the data cartridge is securely attached. Check switch settings; if necessary, correct the switch settings. Try to enable the FDI (try to software-disable, hardware-disable, and reenable). If a program cannot be loaded or the FDI is still disabled, replace it. If necessary, replace the data cartridge. If the FDU is still not operating, go to the next possible cause.
Defective FDU or cable	Replace the FDU. If it is still disabled, replace the cable between the FDU and FDI.

Symptom: IODU/C not operating

There may or may not be a lit LED on the front of the IODU/C. For more information about IODU/C, see *Avaya Communication Server 1000M and Meridian 1 Large System Upgrades Overview (NN43021-458)*. For information about switch settings, see *Avaya Circuit Card Reference (NN43001-311)*. It may be necessary to replace one of the following:

- IODU/C: NT5D61
- cPCI Core/Network Card Cage AC/DC: NT4N46AA

Possible cause	Action
Defective IODU/C (lit LED)	Unseat the IODU/C and reinstall it. If the IODU/C does not recover, continue with this procedure. Try to restore the hard drive from disks: • Stat, enable, and test the CMDU part of the IODU/C card:

Possible cause	Action
	`LD 137 STAT CMDU x TEST CMDU x DIS CMDU X SYNC ENL CMDU X` If the problem continues, a CIOD system message appears and the LED lights on the faceplate.
	If the program cannot be loaded, replace the IODU/C: • If you can load the program, test the port you used for the system terminal. • If the port is okay, test the cable to the system terminal. • If the cable is okay, check the system terminal. If the CMDU part of the IODU/C is still faulty, go to the next possible cause.
Defective IOP part of the IODU/C card	Check the IOP part of the IODU/C card: • Reinstall the IODU/C card; test and enable the IOP part of the IODU/C card. `LD 137 DIS IOP TEST IOP ENL IOP` If the IODU/C is still faulty, go to the next possible cause.
Defective backplane connection to IODU/C (LED not lit)	Try to test the IODU/C by entering: **`LD 137 TEST CMDU x`** where **`x`** = the IODU/C card number 0 or 1 If the CMDU part of the IODU/C card is still faulty, replace the IODU/C card. If the CMDU part of the IODU/C enables after it is moved, replace the card cage assembly in the module from which it was removed.
CD-ROM drive not operating	For redundant systems, remove the disk from the CD-ROM drive, place it in the CD-ROM drive of the other Core, and test operation. If the CD-ROM drive is operational, it may be necessary to replace the IODU/C card with the faulty CD-ROM drive.
CD disk is damaged	If there is another CD-ROM disk, insert that CD-ROM disk into a known operational IODU/C card, and load the Software Installation Tool from the correct Install Program diskette. In the Software Installation Tool, go to the Tools Menu and select option <j> - "To check the customer-specific part of the CD-ROM." If this test is successful, the message "Checking directory /cdx/xxxx_DMR.Nxx ended successfully" is displayed. If the test is successful, it is unlikely the CD-ROM disk is damaged. However, if the test indicates a failure to read all files on the CD-ROM disk, then the CD-ROM disk is damaged and should be replaced.

Possible cause	Action
Mismatch between the Security Device and keycode.	Positively identify the NT SDID (8 digits engraved on the face of the Security Device) with the NT SDID contained on the keycode floppy disk label, and verify the NT SDIDs match.
IODU/C Software Installation Tool does not load	Verify that the correct Install Program diskette is being used for the CP card in the system.

Chapter 8: Clearing network equipment faults

Contents

This section contains information on the following topics:

Network equipment faults

Network equipment provides speech path switching and transmits and receives signaling messages from the CPU. Network equipment can include:

- Conference/tone and Digit switch (CONF/TDS) card: provides conference capability, all tones for the system, and multi frequency sender (MFS) functionality
- Intergroup Switch (IGS) card: provides speech path switching between network groups for Meridian 1 PBX 81C
- network card: provides digital switching for the system
- The NT8D04 Superloop Network Card provides the equivalent of four network loops. The NT1P61 Fiber Superloop Network card and the NT7R51 Local Carrier Interface card provide the equivalent of two network loops.
- Peripheral Signaling (PS) card: provides the signaling interface to the CPU and clocking
- The NTND02 Misc/SDI/Peripheral Signaling Card combines the functionality of peripheral signaling and SDI cards, as well as miscellaneous CPU functions.
- Serial Data Interface (SDI) card: provides the interface from the CPU to an input/output (I/O) device

Network equipment faults can cause system initializations and disable conference capability or all terminal connections (such as trunks and telephones) on a loop. Defective network equipment can make functional peripheral equipment seem faulty.

Fault clearing procedures

Manual continuity tests can be used to isolate superloop network card and IPE faults. For a description of manual continuity tests, see Software maintenance tools on page 147. See "LD 45" in *Avaya Software Input Output Reference – Maintenance (NN43001-711)* for details on performing the tests.

Look up all system messages and maintenance display codes in the *Avaya Software Input Output Reference – System Messages (NN43001-712)* and follow the instructions given. Continually observe and look up system messages while performing this procedure.

Replace equipment as described on Replacing equipment on page 187.

Table 11: Common network fault indicators on page 60 lists common network equipment fault indications. Refer to How to clear faults on page 29 for complete fault clearing process.

Caution:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Table 11: Common network fault indicators

Indicator	Possible indications
System messages	BSD081, 101, 110, 111, 121, 130, 201–203, 205–209, 600, 602 CNF messages DTA, DTC, DTI messages ERR020, 120, 4060 INI003, 007–012 NWS101, 141, 201–204, 301, 401 OVD021, 022, 023, 031 TDS messages XMI messages
Visual indicators	Minor alarm on an attendant console Red LEDs lit or flashing on cards
User reports	Minor alarm reported by attendant Users cannot transfer or conference Users cannot dial out on 500/2500 telephones No dial tone at all sets; no display on digital sets

Symptom: Disabled loop indicated by OVD message (NT1P61 Fiber Superloop Network Card)

An overload (OVD) system message indicates that a loop on an NT1P61 Fiber Superloop Network Card is disabled. All terminal connections on the loop are disabled. A red LED on the card may be lit or flashing. It may be necessary to replace one of the following:

- Fiber Peripheral Controller card: NT1P62
- Fiber Superloop network card: NT1P61
- IPE card
- Cable between superloop network card and controller card

Possible cause	Action
Defective superloop network card	Hardware-disable and reenable the superloop network card to initiate a self-test, or execute the **`XNTT loop`** command. If the test fails, check the card status. Check the status of the Fiber Superloop Network card: `LD 30 STAT loop` where "loop" represents the loop number. Check the display and take steps to resolve the problem indicated in the status report.
	If an OVD message is received, replace the superloop network card. If the card is disabled, enable it by executing the **`ENLL loop`** command. If the response is UNEQ, install the card correctly and observe self-test.

Defective controller card	Perform the Fiber Peripheral Controller card self-test:
	`DSXP x`
	where "x" represents the controller number.
	If the test passed, enable the card by executing:
	`ENXP x`
	where "x" represents the controller number.
	If the test failed, check the maintenance display codes on the controller card and wait for an OVD message. In the OVD message is received, replace the card.
	If there is no OVD message, go to the next possible cause.

Defective IPE card	Reinsert the IPE cards one at a time. Wait for an OVD message after each card is inserted. If the red LED lights when a card is inserted, software-disable the card and try to reenable it. If it does not enable, replace the card. If an OVD message is received when one of the IPE cards is inserted, replace that card. If there is no OVD message as the cards are inserted, go to the next possible cause.

Possible cause	Action
Defective Fiber-optic span	To check the Fiber-optic span, perform a loopback test across the span. Load **LD 45** and execute the **XCON 6** test with Fiber Superloop Network card as the generator and detector with span looped at the Fiber Peripheral Controller card at the Fiber Remote IPE. Check the test results and proceed accordingly.
Defective terminal equipment	Check terminal equipment (such as attendant consoles and telephones) on the disabled loop. If defective terminal equipment is found, see the appropriate chapter (such as Clearing attendant console faults on page 89) to fix the fault.

Symptom: Disabled loop indicated by OVD message (NT7R51 Local Carrier Interface Card)

An overload (OVD) system message indicates that a loop on an NT7R51 Local Carrier Interface Card is disabled. All terminal connections on the loop are disabled. A red LED on the card may be lit or flashing. It may be necessary to replace one of the following:

- Remote Carrier Interface card: NT7R52
- Local Carrier Interface card: NT7R51
- IPE card
- Cable between superloop network card and controller card

Possible cause	Action
Defective Local Carrier Interface card	Hardware-disable and re-enable the superloop network card to initiate a self-test. If the test fails, replace the card. If the test passes, follow the procedure below. Check the status of the Local Carrier Interface card: `LD 32 STAT sl` where "sl" represents the loop number. Check the display and take steps to resolve the problem indicated in the status report. If an OVD message is received, replace the superloop network card. If the card is disabled, enable it by executing the **ENLL sl** command. If the response is UNEQ, install the card correctly and observe self-test.
Defective Remote Carrier Interface card	Unseat all cards on the IPE shelf except the Remote Carrier Interface card. Unseat and seat the Remote Carrier Interface card to start self-test. Observe self-test: If the test passed, enable the card by executing: `ENXP x`

Possible cause	Action
	where "x" represents the controller number. If the test failed, check the maintenance display codes on the card faceplate and wait for an OVD message. In the OVD message is received, replace the card. If there is no OVD message, go to the next possible cause.
Defective IPE card	Reinsert the IPE cards one at a time. Wait for an OVD message after each card is inserted. If the red LED lights when a card is inserted, software-disable the card and try to re-enable it. If it does not enable, replace the card. If an OVD message is received when one of the IPE cards is inserted, replace that card. If there is no OVD message as the cards are inserted, go to the next possible cause.
Defective cable	To check the carrier span, perform loopback test across the span. Load **`LD 45`** and execute the **`XCON 6`** test with Local Carrier Interface card as the generator and detector with span looped at the Remote Carrier Interface card at the Carrier Remote IPE. Check the test results and proceed accordingly. If there is no OVD message, go to the next possible cause.
Defective terminal equipment	Check terminal equipment (such as attendant consoles and telephones) on the disabled loop. If defective terminal equipment is found, see the appropriate chapter (such as Clearing attendant console faults on page 89) to fix the fault.
Defective Local Carrier Interface card	Hardware-disable and re-enable the superloop network card to initiate a self-test. If the test fails, replace the card. If the test passes, follow the procedure below. Check the status of the Local Carrier Interface card: `LD 32 STAT sl` where "sl" represents the loop number. Check the display and take steps to resolve the problem indicated is the status report. If an OVD message is received, replace the superloop network card. If the card is disabled, enable it by executing the **`ENLL sl`** command. If the response is UNEQ, install the card correctly and observe self-test.
Defective Remote Carrier Interface card	Unseat all cards on the IPE shelf except the Remote Carrier Interface card. Unseat and seat the Remote Carrier Interface card to start self-test. Observe self-test: If the test passed, enable the card by executing: `ENXP x` where "x" represents the controller number. If the test failed, check the maintenance display codes on the card faceplate and wait for an OVD message. In the OVD message is received, replace the card. If there is no OVD message, go to the next possible cause.

Possible cause	Action
Defective IPE card	Reinsert the IPE cards one at a time. Wait for an OVD message after each card is inserted. If the red LED lights when a card is inserted, software-disable the card and try to re-enable it. If it does not enable, replace the card. If an OVD message is received when one of the IPE cards is inserted, replace that card. If there is no OVD message as the cards are inserted, go to the next possible cause.
Defective cable	To check the carrier span, perform a loopback test across the span. Load **LD 45** and execute the **XCON 6** test with the Local Carrier Interface card as the generator and detector with span looped at the Remote Carrier Interface card at the Carrier Remote IPE. Check the test results and proceed accordingly. If there is no OVD message, go to the next possible cause.
Defective terminal equipment	Check terminal equipment (such as attendant consoles and telephones) on the disabled loop. If defective terminal equipment is found, see the appropriate chapter (such as Clearing attendant console faults on page 89) to fix the fault.

Symptom: Disabled loop indicated by OVD message (NT8D04 Superloop Network Card)

An overload (OVD) system message indicates that a loop on an NT8D04 Superloop Network Card is disabled. All terminal connections on the loop are disabled. A red LED on the card may be lit or flashing. It may be necessary to replace one of the following:

- Controller card: NT8D01
- Superloop network card: NT8D04
- IPE card
- Cable between superloop network card and controller card

Possible cause	Action
Defective superloop network card	Hardware-disable and re-enable the superloop network card to initiate a self-test. If the test fails, replace the card. If the test passes, follow the procedure below. Disconnect the loop cable(s) to the superloop network card. Enable and test each loop on the card by entering: `LD 32 ENLL loop` "loop" represents the loop number. Wait for an OVD message. If an OVD message is received, replace the superloop network card.

Possible cause	Action
	If there is no OVD message, go to the next possible cause.
Defective controller card	Unseat all cards on the IPE shelf except the controller card. Reconnect the loop cable to the controller card and enable the card by entering: `ENXP x` "x" represents the controller number. If more than one shelf is involved, follow this and subsequent procedures one at a time for each controller card. Check the maintenance display codes on the controller card and wait for an OVD message. If an OVD message is received, unseat and reinstall the controller card to initiate a self-test. If the test fails, replace the card and reinsert cards on the IPE shelf. If there is no OVD message, go to the next possible cause.
Defective IPE card	Reinsert the IPE cards one at a time. Wait for an OVD message after each card is inserted. If the red LED lights when a card is inserted, software-disable the card and try to re-enable it. If it does not enable, replace the card. If an OVD message is received when one of the IPE cards is inserted, replace that card. If there is no OVD message as the cards are inserted, go to the next possible cause.
Defective cable	Disconnect the loop cable at the controller card. (If there is more than one loop cables, disconnect them one at a time and follow the procedure below for each cable.) Reconnect the cable(s) to the superloop network card and wait for an OVD message. If an OVD message is received, replace the cable. If there is no OVD message, go to the next possible cause.
Defective terminal equipment	Check terminal equipment (such as attendant consoles and telephones) on the disabled loop. If defective terminal equipment is found, see the appropriate chapter (such as Clearing attendant console faults on page 89) to fix the fault.

Symptom: Loop disabled without OVD message (NT8D04 Superloop Network Card)

There is probably a system message indicating the loop or loops on this card are defective or disabled, but there is no overload (OVD) message indicating the card is disabled. The LED on the faceplate may be lit or flashing. It may be necessary to replace one of the following:

- Controller card: NT8D01
- Superloop network card: NT8D04

- IPE card
- Cable between superloop network card and controller card

Possible cause	Action

Defective superloop network card	Hardware-disable and re-enable the superloop network card to initiate a self-test. If the test fails, replace the card. If the test passes, follow the procedure below.
	Disconnect the loop cable(s) to the superloop network card. Try to enable each loop on the card by entering:
	`LD 30 ENLL loop`
	"loop" represents the loop number.
	Test each loop by entering:
	`LOOP loop`
	If an OVD message is received at this point, replace the superloop network card.
	If there is no OVD message and the loops do not enable, go to the next possible cause.

Defective controller card	Unseat all cards on the IPE shelf except the controller card. Reconnect the loop cable to the controller card and enable the controller card by entering: `LD 32 ENXP x` "x" represents the controller number. If more than one shelf is involved, follow this and subsequent procedures one at a time for each controller card. Check the maintenance display codes on the controller card. If an OVD message is received at this point, unseat and re-install the controller card to initiate a self-test. If the test fails, replace the card. Re-insert cards on the IPE shelf. If there is no OVD message and the loops do not enable, go to the next possible cause.
Defective IPE card	Reinsert the IPE cards one at a time. If the red LED lights when a card is inserted, software-disable the card and try to re-enable it. If it does not enable, replace the card. If an OVD message is received when one of the IPE cards is inserted, replace that card. If no LEDs light and there is no OVD message as the cards are re-inserted, go to the next possible cause.
Defective cable	Disconnect the loop cable at the controller card. (If there is more than one cable, disconnect them one at a time and follow the procedure below for each cable.) Reconnect the cable(s) to the superloop network card. If an OVD message is received at this point replace the cable. If there is no OVD message and the loops do not enable, go to the next possible cause.
Defective terminal equipment	Check terminal equipment (such as attendant consoles and telephones) on the disabled loop.

Possible cause	Action
	If defective terminal equipment is found, see the appropriate chapter (such as Clearing attendant console faults on page 89) to fix the fault.

Symptom: Disabled loop indicated by OVD message (QPC414 Network Card)

An overload (OVD) system message indicates that a loop on a QPC414 Network Card is disabled. All terminal connections on the loop are disabled. A red LED on the card may be lit. For information about switch settings, see *Avaya Circuit Card Reference (NN43001-311)*. It may be necessary to replace one of the following:

- Dual loop peripheral buffer (DLB) card: QPC659
- Network card: QPC414
- IPE card
- Cable between network card and DLB card

Possible cause	Action

Defective network card	Disconnect the loop cable(s) to the network card. Enable and test each loop on the network card by entering:
	`LD 30 ENLL loop`
	"loop" represents the loop number.
	Test each loop by entering:
	`LOOP loop`
	Wait for an OVD message.
	If an OVD message is received, replace the network card.
	If there is no OVD message, go to the next possible cause.

Defective DLB card	Unseat all cards on the IPE shelf except the DLB card (if there are two shelves on the loop, disconnect the cable to connector LPY): • Reconnect the loop cable to the DLB card. • If an OVD message is received, replace the DLB card and reinsert cards on the IPE shelf. If there is no OVD message: • Check switch settings on the DLB card; if necessary, correct the switch settings. • If there are two shelves on the loop, go to the next possible cause. • If there is one shelf on the loop, go to Symptom: Disabled peripheral equipment card on page 80

Possible cause	Action
Defective DLB card on second shelf (if two shelves are on the loop)	Unseat all cards on the second shelf except the DLB card. Reconnect the inter-shelf cable to the DLB card and wait for an OVD message. If there is an OVD message, replace the DLB card and reinsert cards on the IPE shelf. If there is no OVD message, go to the next possible cause.
Defective NT5K10 DLB card	In Dual Loop Mode • Unseat 4 IPE cards pertaining to the defective loop or In Single Loop Mode • Unseat 8 IPE cards pertaining to the defective loop. Wait for the OVD message. If there is no OVD message, go to the defective IPE card. If an OVD message is received, remove the backplane access plate at the back of the EEPE shelf and replace the Dual Loop Peripheral Buffer Card. Reinsert the IPE cards on the shelf. Replace the backplane access plate.
Defective IPE card	Reinsert the IPE cards one at a time. (If there are two shelves on the loop, follow this and subsequent procedures one at a time for each shelf.) Wait for an OVD message after each card is inserted. If the LED lights when a card is inserted, software-disable the card and try to re-enable it. If it does not enable, replace the card. If an OVD message is received when one of the IPE cards is inserted, replace that card. If there is no OVD message as the cards are re-inserted, go to the next possible cause.
Defective cable between network and DLB cards	For the EEPE shelf only: remove the backplane access plate at the back of the module. Disconnect the loop cable at the DLB card. Reconnect the cable(s) to the network card and wait for an OVD message. If an OVD message is received, replace the cable. If there is no OVD message, go to the next possible cause. For the EEPE shelf only: replace the backplane access plate.
Defective cable between shelves (if two shelves are on the loop)	Disconnect the inter-shelf cable to connector LPX on the second shelf DLB card. Reconnect the cable to connector LPY on the first shelf DLB card and wait for an OVD message. If an OVD message is received, replace the inter-shelf cable. Reinsert cards on the IPE shelf. If there is no OVD message, go to the next possible cause.
Defective terminal equipment	Check terminal equipment (such as attendant consoles and telephones) on the disabled loop. If defective terminal equipment is found, see the appropriate chapter (such as Clearing attendant console faults on page 89) to fix the fault.

Symptom: Loop disabled without OVD message (QPC414 Network Card)

There is probably a system message indicating that the loop or loops on this card are defective or disabled, but there is no overload (OVD) message indicating the card is disabled. The LED on the faceplate may be lit. For information about switch settings, see *Avaya Circuit Card Reference (NN43001-311)*. It may be necessary to replace one of the following:

- Dual loop peripheral buffer (DLB) card: QPC659
- Network card: QPC414
- IPE card
- Cable between network card and DLB card

Possible cause	Action

Defective network card	Test the loops on the card by entering:
	`LD 30 LOOP loop`
	"loop" represents the loop number.
	Try to enable the loops by entering:
	`ENLL loop`
	Wait for an OVD message.
	If an OVD message is received, replace the network card.
	If there is no OVD message and the loops do not enable, go to the next possible cause.

Defective DLB card	Unseat all cards on the IPE shelf except the DLB card (if there are two shelves on the loop, disconnect the cable to connector LPY): • Reconnect the loop cable to the DLB card. • If an OVD message is received at this point, replace the peripheral buffer card and reinsert cards on the IPE shelf. If there is no OVD message and the loops do not enable: • Check switch settings on the DLB card; if necessary, correct the switch settings. • If there are two shelves on the loop, go to the next possible cause. • If there is one shelf on the loop, go to Symptom: Disabled peripheral equipment card on page 80.
Defective QPC659 DLB card on second shelf (if two shelves are on the loop)	Unseat all cards on the second shelf except the DLB card. Reconnect the inter-shelf cable to the DLB card. If an OVD message is received at this point, replace the DLB card and reinsert cards on the IPE shelf. If there is no OVD message and the loops do not enable, go to the next possible cause.

Possible cause	Action
Defective NT5K10 Peripheral Buffer Card	In Dual Loop Mode • Unseat 4 IPE cards pertaining to the defective loop or In Single Loop Mode • Unseat 8 IPE cards pertaining to the defective loop. Wait for the OVD message. If there is no OVD message, go to the defective IPE card. If an OVD message is received, remove the backplane access plate at the back of the EEPE shelf and replace the Dual Loop Peripheral Buffer Card. Reinsert the IPE cards on the shelf. Replace the backplane access plate.
Defective IPE card	Reinsert the IPE cards one at a time. (If there are two shelves on the loop, follow this and subsequent procedures one at a time for each shelf.) If the LED lights when a card is inserted, software-disable the card and try to re-enable it. If it does not enable, replace the card. If an OVD message is received when one of the IPE cards is inserted, replace that card. If no LEDs light and there is no OVD message as the cards are re-inserted, go to the next possible cause.
Defective cable between network and DLB cards	For EEPE shelf only: remove the backplane access plate at the rear of the module. Disconnect the loop cable at the DLB card. Reconnect the cable(s) to the network card. If an OVD message is received at this point, replace the cable. If there is no OVD message and the loops do not enable, go to the next possible cause. For EEPE shelf only: remove the backplane access plate at the rear of the module.
Defective cable between shelves (if two shelves on the loop)	Disconnect the inter-shelf cable to connector LPX on the second shelf DLB card. Reconnect the cable to connector LPY on the first shelf DLB card. If an OVD message is received at this point, replace the inter-shelf cable. Reinsert cards on the IPE shelf. If there is no OVD message and the loops do not enable, go to the next possible cause.
Defective terminal equipment	Check terminal equipment (such as attendant consoles and telephones) on the disabled loop. If you find defective terminal equipment, see the appropriate chapter (such as Clearing attendant console faults on page 89) to fix the fault.

Symptom: Disabled peripheral signaling card indicated by OVD message

There is an overload (OVD) system message indicating that a peripheral signaling card is disabled. The LED on the faceplate may be lit. It may be necessary to replace one of the following:

- Superloop network card or network card: NT8D04, QPC414
- PS card: QPC43R
- Clock controller: QPC471
- D-channel handler interface card: QPC757

Possible cause	Action
Defective PS card	Unseat all network cards associated with the PS card. Enable the PS card by entering: `LD 32 ENPS x` "x" represents the PS card number. Wait for an OVD message. If an OVD message is received, replace the PS card. If there is no OVD message, go to the next possible cause.
Defective network card	Reinsert network cards one at a time. Wait for an OVD message after each card is inserted. If an OVD message is received when one of the cards is inserted, replace that card. Reenable the PS card by entering: `LD 32 ENPS x` If there is no OVD message, go to the next possible cause.

Symptom: Peripheral signaling card disabled without OVD message

The peripheral signaling card is disabled on one shelf. The LED on its faceplate may be lit. There is no overload (OVD) message indicating a fault with this card. It may be necessary to replace one of the following:

- Superloop network card or network card: NT8D04, QPC414
- PS card: QPC43R
- Clock controller: QPC471
- D-channel handler interface card: QPC757

Possible cause	Action
Defective PS card	Unseat all network cards associated with the PS card. Try to enable the PS card by entering: `LD 32 ENPS x` where "x" represents the PS card number. If an OVD message is received at this point or the PS card cannot be enabled, replace the card. If the PS card is still disabled, go to the next possible cause.
Defective network card	Reinsert network cards one at a time. If an OVD message is received when one of the cards is inserted or if the card is disabled, replace that card. Reenable the PS card by entering: `LD 32 ENPS x` If the PS card is still disabled, go to the next possible cause.

Symptom: Problems with transferring, placing conference calls, or Music-on-Hold

Several users cannot transfer or place conference calls, or calls do not receive Music-on-Hold. A card that provides conference capability may be disabled. It may be necessary to replace one of the following:

- Conference/TDS card: NT8D17
- PS card: QPC43R
- 3PE card: QPC441
- Telephone keys

Possible cause	Action

Defective conference/TDS card	If there are no messages indicating a fault on any conference loop, test each conference loop in the system by entering:
	`LD 38 CNFC loop`
	"loop" represents the conference loop number.
	See *Avaya Software Input Output Reference – Maintenance (NN43001-711)* for other tests.
	If the conference loop is disabled, try to enable it by entering:
	`LD 38 ENLX loop`
	"loop" represents the Conference loop, which is the odd loop of the Conference/TDS loop pair.
	You must enable the card with the command ENLX. Enabling the loops with the command ENLL does not enable the hardware.
	If a fault is indicated on a conference loop, replace the conference/TDS card identified.
	If no faults are detected on any conference loop, go to the next possible cause.

Possible cause	Action
Defective card on Network shelf	One at a time, replace the following cards until the fault clears: • 3PE card • PS card If there is still a Conference problem, go to the next possible cause.
Defective telephone keys	Check the keys on any telephone with this problem. See the following technical publications: • *Avaya Software Input Output Reference – Maintenance (NN43001-711)*—LD 31 tests • *Avaya Telephones and Consoles Fundamentals (NN43001-567)*
Excessive traffic in the system	Additional conference/TDS cards may be required to handle the traffic in the system. See *Avaya Traffic Measurement: Formats and Outputs Reference (NN43001-750)*.

Symptom: Problems placing calls on 2500 telephones and some trunks

Several users of 2500 telephones may report trouble placing calls. Other users may report trouble dialing on certain trunks. A digitone receiver or a card that provides tone and digit switch capability may be disabled. It may be necessary to replace one of the following:

- Tone Detector Card: QPC422
- Conference/TDS card: NT8D17
- DTR card: NT8D16
- Network/DTR card: NT8D18

Possible cause	Action

Defective digitone receiver	Check for disabled digitone receiver TNs by entering:
	`LD 34 STAT`
	If any are disabled, try to enable them by entering:
	`ENLR l s c u`
	where l s c u = loop, shelf, card, unit
	Test the digitone receiver by entering:
	`DTR l s c u`
	If the digitone receiver fails the test, replace it.
	If the digitone receiver passes the test, go to the next possible cause.

Defective conference/TDS card	Test Tone and Digit Switch loops by entering: `LD 34 TDS loop` "loop" represents the loop number. If the conference loop is disabled, try to enable it by entering:

Possible cause	Action
	`ENLX loop` where "loop" represents the TDS/MFS loop, which is the even loop of the Conference/TDS loop pair). You must enable the card with the command ENLX. Enabling the loops with the command ENLL does not enable the hardware. If a fault is indicated on a conference loop, replace the conference/TDS card identified. If no faults are detected on any conference loop, go to the next possible cause.
Excessive traffic in the system	Additional digitone receivers or conference/TDS cards may be required to handle the traffic in the system. See *Traffic Measurement: Formats and Outputs Reference (NN43001-750)*.

Chapter 9: Clearing peripheral equipment faults

Contents

This section contains information on the following topics:

Peripheral equipment faults

Intelligent Peripheral Equipment (IPE) provides the interface betweesn network equipment switching and terminal equipment (such as trunks, telephones, data sets, and attendant consoles). Peripheral equipment faults can disable network and terminal equipment.

For fault clearing purposes, the general term "peripheral equipment" includes intelligent peripheral equipment (IPE). When there are differences, IPE is specified.

> **Caution:**
>
> NT6D71 fuse replacement F1 through F16.
>
> For continued protection against risk of fire, replace the fuse only with a fuse of the same type and rating (125 V, 1.0 A).

Fault clearing procedures

The following table lists common peripheral equipment fault indications (many other system messages may be generated). Refer to How to clear faults on page 29 for complete fault clearing process.

Symptom: Red LED lit on Fiber Peripheral Controller card

The red LED is lit on the controller card. Red LEDs on IPE cards on the same shelf may be lit. It may be necessary to replace one of the following:

- Fiber Peripheral Controller card: NT1P62
- IPE card
- IPE card cage: NT8D3703

Possible cause	Action
Defective Fiber peripheral controller card	Perform the Fiber controller card self-test by executing the **DSXP x** command for LD 32 to disable the card. Execute the **XPCT x** command to initiate self-test. • The maintenance display on the card shows the code for each test running (see "HEX" in *Avaya Software Input Output Reference – Maintenance (NN43001-711)*If the tests complete successfully, the display continuously flashes. • If the card continually fails a test, the code for that test is steadily displayed. If the test fails, replace the card. If the test passes but the card is still disabled, enable the card: **ENXP x** "x" represents the controller number. If the test fails, go to the next possible cause.
Defective IPE card	Unseat all the cards in the shelf associated with the controller card: • If the red LED on the controller card turns off, the fault is in one of the unseated cards. • Reinsert the cards one at a time. • When the controller card LED turns on again, replace the last card inserted. If the red LED on the controller card does not turn off when the IPE cards are unseated, reinstall the cards and go to the next possible cause.
Defective cable	Test all cables to the controller card. If a defective cable is found, replace it. If there is no problem with the cables, go to the next possible cause.
Defective backplane	Replace the card cage assembly in the module.

Symptom: Red LED lit on Remote Carrier Interface card

The red LED is lit on only one controller card. Red LEDs on IPE cards on the same shelf may be lit. It may be necessary to replace one of the following:

- Remote Carrier Interface card: NT7R52
- IPE card
- IPE card cage: NT8D3703

Possible cause	Action
Defective Remote Carrier Interface card	Perform the Remote Carrier Interface card self-test by removing and reinstalling the card. Observe the self-test: • The maintenance display on the card shows the code for each test running (see "HEX" in *Avaya Software Input Output Reference – Maintenance (NN43001-711)*If the tests complete successfully, the display continuously flashes. • If the card continually fails a test, the code for that test is steadily displayed. If the test fails, replace the card. If the test passes but the card is still disabled, enable the card: **`ENLL sl`** "sl" represents the card number. If the test fails, go to the next possible cause.
Defective IPE card	Unseat all the cards in the shelf associated with the controller card: • If the red LED on the controller card turns off, the fault is in one of the unseated cards. • Reinsert the cards one at a time. • When the controller card LED turns on again, replace the last card inserted. If the red LED on the controller card does not turn off when the IPE cards are unseated, reinstall the cards and go to the next possible cause.
Defective cable	Test all cables to the controller card. If you find a defective cable, replace it. If there is no problem with the cables, go to the next possible cause.
Defective backplane	Replace the card cage assembly in the module.

Symptom: Red LED lit on Peripheral Controller card

The red LED is lit on only one controller card. Red LEDs on IPE cards on the same shelf may be lit. It may be necessary to replace one of the following:

- Controller card: NT8D01BC, NT8D01AC, NT8D01AD
- IPE card
- IPE card cage: NT8D3703

Possible cause	Action
Defective controller card	Remove and reinstall the controller card to initiate a self-test: • The maintenance display on the card shows the code for each test running (see "HEX" in the *Avaya Software Input Output Reference – Maintenance (NN43001-711)* • If the tests complete successfully, the display continuously flashes. • If the card continually fails a test, the code for that test is steadily displayed. If the test fails, replace the card. If the test passes but the card is still disabled, test the loop by entering: **`LD 30 LOOP loop`** "loop" represents the loop number. If the test fails, go to the next possible cause.
Defective IPE card	Unseat all the cards in the shelf associated with the controller card: • If the red LED on the controller card turns off, the fault is in one of the unseated cards. • Reinsert the cards one at a time. • When the controller card LED turns on again, replace the last card you inserted. If the red LED on the controller card does not turn off when the IPE cards are unseated, reinstall the cards and go to the next possible cause.
Defective cable	Test all cables to the controller card. If a defective cable is found, replace it. If there is no problem with the cables, go to the next possible cause.
Defective backplane	Replace the card cage assembly in the module.

Symptom: Red LED lit on dual loop peripheral buffer card

The red LED is lit on only one dual loop peripheral buffer card. Red LEDs on IPE cards on the same shelf may be lit. For information about switch settings, see *Avaya Circuit Card Reference (NN43001-311)*. It may be necessary to replace one of the following:

- Dual-loop Peripheral Buffer (DLB) card: QPC659 or NT5K10
- Existing Peripheral Equipment Power Supply (EPEPS): NT5K12
- Cable between the Network Superloop card and the Enhanced Dual Loop Peripheral Buffer Card
- IPE card
- IPE card cage NT8D1303 or NT5K1106

Possible cause	Action
Defective QPC659M DLB card	Test the shelf by entering: **`LD 30 LOOP l s`** "l s" represents loop and shelf numbers. If two loops are assigned to the shelf, be sure to test both. If a defective DLB card is indicated, check the switch settings on the card. If the switch settings are correct, replace the card. If the test fails but the DLB card does not seem to be faulty, go to the next possible cause.
Defective QPC659 DLB card	In Dual Loop Mode • Unseat 4 IPE cards pertaining to the defective loop or In Single Loop Mode • Unseat 8 IPE cards pertaining to the defective loop. Wait for the OVD message. If there is no OVD message, go to the defective IPE card. If an OVD message is received, remove the backplane access plate at the rear of the EEPE shelf and replace the Dual Loop Peripheral Buffer Card. Reinsert the IPE cards on the shelf. Replace the backplane access plate.
Defective IPE card	For the EEPE shelf only: remove the backplane access plate at the rear of the module. Unseat all the cards in the shelf associated with the DLB card: • If the red LED on the DLB card turns off, the fault is in one of the unseated cards. • Reinsert the cards one at a time. • When the DLB LED turns on again, replace the last card inserted.

Possible cause	Action
	If the red LED on the DLB does not turn off when the IPE cards are unseated, reinstall the cards and go to the next possible cause. For the EEPE shelf only: replace the backplane access plate at the rear of the module.
Defective cable	Test all cables to the DLB card. If a defective cable is found, replace it. If there is no problem with the cables, go to the next possible cause.
Defective backplane	Replace the card cage assembly in the module.

Symptom: Disabled peripheral equipment card

One IPE card is disabled, the red LED on a IPE card is lit, or two or more units on a card are disabled. A system message indicates that the card or units on the card are disabled. Only one card on the shelf is affected. It may be necessary to replace one of the following:

- Controller card: NT8D01BC, NT8D01AC, NT8D01AD
- Dual loop peripheral buffer (DLB) card: QPC659
- Superloop network card and network card: NT8D04, QPC414
- IPE card
- IPE card cage: NT8D1303, NT8D3703

Possible cause	Action
Defective IPE card	Replace the affected card. Enable the card by entering: **`LD 32 ENLC l s c`** l s c = loop, shelf, card Test the card by entering: **`LD 30 SHLF l s`**
Defective controller card or DLB card	Replace the controller card or DLB card. Enable the IPE card by entering: **`LD 32 ENLC l s c`** Test the card by entering: **`LD 30 SHLF l s`**
Defective network card	Replace the network card. Test the loop by entering: **`LOOP loop`** "loop" represents the loop number.
Defective backplane	Replace the card cage assembly in the module.

Symptom: More than one peripheral equipment card disabled

More than one IPE card, or two or more units on different cards, are disabled on the same shelf. There is a system message indicating that the cards or units on the cards are disabled. It may be necessary to replace one of the following:

- Cable between network card and IPE shelf
- Controller card: NT8D01BC, NT8D01AC, NT8D01AD
- Dual loop peripheral buffer (DLB) card: QPC659
- Superloop network card and network card: NT8D04, QPC414
- IPE card
- IPE card cage: NT8D1303, NT8D3703

Possible cause	Action
Defective controller card or DLB card	Replace the controller card or DLB card. Enable the IPE card by entering: **LD 32 ENLC l s c** l s c = loop, shelf, and card numbers. Test the card by entering: **LD 30 SHLF l s**
Defective cable from network card	Disable the loop for the affected shelf by entering: **DISL loop** "loop" represents the loop number. Replace the cable from the network card to the IPE shelf. Test the loop by entering: **LOOP loop**
Defective network card	Replace the network card. Test the loop by entering: **LOOP loop**
Defective IPE card	Replace the affected card. Enable the card by entering: LD 32 ENLC l s c Test the card by entering: LD 30 SHLF l s
Defective backplane	Replace the card cage assembly in the module.

Chapter 10: Clearing trunk faults

Contents

This section contains information on the following topics:

Trunk faults

Trunk cards provide the interface between the peripheral equipment buffer and various trunk facilities. This chapter specifically considers two types of trunk cards:

- E&M trunk card: provides four analog trunks, each of which can be individually configured to operate as:
    - E&M signaling trunk
    - Two-wire tie trunk
    - Two-wire tie trunk Type V (BPO)
    - DC-5 trunk
    - 2280 Hz tie trunk
    - Four-wire tie trunk
    - Four-wire tie trunk type V (BPO)
    - Four-wire tie trunk type C2 Earth-off Idle
    - Paging trunk
- Universal trunk card: provides eight trunks, each of which can be individually configured to operate as:
    - Central Office (CO) trunk
    - Direct Inward Dialing (DID) trunk
    - Two-way tie, Dial Repeating (2DR)

- Two-way tie, Outgoing Automatic Incoming Dial (OAID) trunk
- Outgoing Automatic Number Identification (OANI) trunk
- Recorded Announcement (RAN) trunk
- Music trunk
- Paging trunk

• Direct Inward Dial Trunk: Provides eight trunks. The signaling supported depends on the country of operation, and can include:

- Direct Inward Dialing (DID) trunk
- Two-way Dial Repeating (2DR)
- Outgoing Automatic Number Identification
- Music On Hold Equipment

• Central Office Trunk: Provides eight trunks. The signaling supported depends on the country of operation, and can include:

- Ground Start
- Loop Start
- A-type signaling
- Loop Start Disconnect Clearing
- Loop Start Guarded Clearing

Trunk faults can cause problems (such as noise) on outside calls and can keep calls from coming in or going out.

Fault clearing procedures

Table 12: Trunk fault indicators on page 84 lists common trunk fault indications. Refer to How to clear faults on page 29 for complete fault clearing process.

Table 12: Trunk fault indicators

Indicator	Possible indications
System messages	ERR090, 220, 270 OVD003, 008, 009, 010 TRK messages
Visual indicators	Red LED lit on trunk card
User reports	Users trouble with a specific trunk Callers report continuous ringing Trouble with calls on console and/or telephones

⚠ Caution:

Module covers are not hinged. Do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Symptom: Trunk cannot make or receive calls (OVD message received)

Calls cannot be made or received over a trunk. An overload (OVD) system message indicates that only the TN for this trunk is disabled. It may be necessary to replace one of the following:

- E&M trunk card: NT8D15
- Universal trunk card: NT8D14
- Central office trunk card: QPC218, QPC219, QPC450, QPC470
- Any other trunk card
- Conference/TDS card: NT8D17
- DTR card: NT8D16
- Tone Detector card: QPC422
- Network/DTR card: NT8D18
- Trunk equipment (such as music source or paging equipment)
- IPE card cage: NT8D1303, NT8D3703

Possible cause	Action
Defective trunk card	If the indicated card is an E&M or universal trunk card, unseat and reinstall the card to initiate a self-test. If the test fails, replace the card. If the test passes, follow the procedure below. Disconnect the wiring between the card and the cross-connect terminal.
	Enable the TN by entering: **`LD 32 ENLU l s c u`** where l s c u = loop, shelf, card, unit Wait for an OVD message. If an OVD message is received, replace the card. If there is no OVD message, reconnect the wiring and go to the next possible cause.
Defective wiring	At the main cross-connect terminal, disconnect the wiring to the CO or other trunk equipment (such as a music source or paging equipment). Enable the TN. Wait for an OVD message. If an OVD message is received, repair or replace the wiring to the IPE shelf. If there is no OVD message, repair or replace the wiring from the cross-connect terminal to the telephone.

Possible cause	Action
	If the trunk card still does not enable or there is still a trunk problem, reconnect the wiring and go to the next possible cause.
Defective trunk equipment	Make sure the CO equipment or other trunk equipment is not defective. If there is no problem with this equipment, go to the next possible cause.
Defective DTR, TDS, or MFS	Use the attendant console to seize trunks and audibly test for dial tone and outpulsing, or use a maintenance telephone and enter: `LD 36 TRK l s c u` See *Avaya Software Input Output Reference – Maintenance (NN43001-711)* for information about this test. If outpulsing is not heard, the digitone receiver, tone and digit switch, or multifrequency sender may not be sending or receiving digits and the fault affects more than one trunk. See the procedures for clearing faults on this equipment. If there is no problem with this equipment, go to the next possible cause.

Defective IPE shelf	Unseat the affected trunk card and enable the TN.
	If there is no OVD message, test superloop TNs by entering:
	`LD 30 UNTT l s c u`
	Test TNs on other loops by entering:
	`LD 45 TEST`
	If an OVD message is received, replace the card cage assembly in the module.

Symptom: Trunk cannot make or receive calls (no OVD message)

Calls cannot be made or received over a trunk, but there is no overload (OVD) or other system message showing that the TN for this trunk is defective or is disabled. It may be necessary to replace one of the following:

- E&M trunk card: NT8D15
- Universal trunk card: NT8D14
- Central office trunk card: QPC218, QPC219, QPC450, QPC470
- Any other trunk card
- Conference/TDS card: NT8D17
- DTR card: NT8D16
- Tone Detector card: QPC422
- Network/DTR card: NT8D18
- Trunk equipment (such as music source or paging equipment)

Possible cause	Action
Defective trunk equipment	Make sure the CO equipment or other trunk equipment is not defective. If there is no problem with this equipment, go to the next possible cause.
Disabled or defective TN	Test TNs on superloops by entering: **`LD 30 UNTT l s c u`** where l s c u = loop, shelf, card, unit Test TNs on other loops by entering: `LD 45 TEST` If the test fails, replace the indicated item and test again.
Defective trunk card	If the card is an E&M or universal trunk card, unseat and reinstall the card to initiate a self-test. If the test fails, replace the card. If the test passes, go to the next possible cause.
Defective wiring	At the main cross-connect terminal, disconnect the wiring to the CO or other trunk equipment. Enable the TN and wait for an OVD message. If an OVD message is received, repair or replace the wiring to the IPE shelf. If there is no OVD message, repair or replace the wiring from the cross-connect terminal to the telephone. If the trunk card still does not enable or there is still a trunk problem, reconnect the wiring and go to the next possible cause.
Defective DTR, TDS, or MFS	Use the attendant console to seize trunks and audibly test for dial tone and outpulsing, or use a maintenance telephone and enter: `LD 36 TRK l s c u` See *Avaya Software Input Output Reference – Maintenance (NN43001-711)* for information about this test.
	If outpulsing is not heard, the digitone receiver, tone and digit switch, or multifrequency sender may not be sending or receiving digits and the fault affects more than one trunk. See the procedures for clearing faults on this equipment. If there is no problem with this equipment, go to the next possible cause.
Excessive traffic in the system	Additional trunk cards may be required to handle the traffic in the system. See *Avaya Traffic Measurement: Formats and Outputs Reference (NN43001-750)*.

Chapter 11: Clearing attendant console faults

Contents

This section contains information on the following topics:

Attendant console faults

Attendant consoles are the operator's interface to the system and its features. Components that can cause an attendant console fault are:

- the console itself or add-on units
- the console power supply
- the building wiring
- the cross-connect from the console to the line circuit
- the unit on the peripheral line card
- the peripheral line card
- the ringing generator
- the peripheral controller card
- the peripheral module power
- the peripheral module backplane

Attendant console faults typically affect only a single attendant. However, if more than one attendant console is affected, look for the following connections, among others:

- they are on the same line card
- they are on the same module

- they are on the same loop
- they are served by the same peripheral controller
- there is a problem with ringing or tones

Use the following software programs to isolate attendant console faults:

- LD 30 to test network loops
- LD 31 to test sets and consoles
- LD 32 to test peripheral controllers
- LD 45 to perform
    - signaling tests
    - manual continuity tests

Fault clearing procedures

Table 13: Console fault indicators on page 90 lists common attendant console fault indications. Refer to How to clear faults on page 29 for complete fault clearing process.

Table 13: Console fault indicators

Indicator	Possible indications
System messages	BSD501—The console (identified by loop, shelf, card, and unit) failed the signaling test. If the unit number is preceded by a minus sign, the console was disabled. There is a console fault or a fault on the peripheral equipment card indicated.
Visual indicators	Red LED lit on associated cards
User reports	Trouble with calls Trouble with equipment (such as handset, headset, or display)

Caution:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Symptom: Console cannot make or receive calls (OVD message received)

The attendant console cannot make or receive calls. There is an OVD message indicating that a TN for the attendant console is disabled. See *Avaya Telephones and Consoles Fundamentals (NN43001-567)* for information about connecting attendant consoles. See

Avaya Communication Server 1000M and Meridian 1 Large System Installation and Commissioning (NN43021-310) for information about system cabling. To replace other equipment, refer to *Avaya Communication Server 1000M and Meridian 1 Large System Maintenance (NN43021-700)*. It may be necessary may need to replace one of the following:

- Attendant console
- IPE card associated with the console
- CE/PE or IPE card cage: NT8D1103, NT8D1303, NT8D3703

Possible cause	Action
Defective IPE card	software-disable the TN indicated by the OVD message by entering: **`LD 32 DISU l s c u`** l s c u = loop, shelf, card, unit Disconnect the wiring between the IPE card and the cross-connect terminal. Reenable the TN by entering: `ENLU l s c u` and wait for an OVD message. If an OVD message is received indicating a problem with the card or unit, replace the card. If there is no OVD message indicating a problem with the card or unit, reconnect the wiring and go to the next possible cause.
Defective console	Disable the TN. Disconnect the wiring from the console to the jack. Reenable the TN and wait for an OVD message. If there is no OVD message, replace the console. If an OVD message is received, reconnect the wiring and go to the next possible cause.
Defective wiring	Disable the TN. Disconnect the wiring between the console and the cross-connect terminal. Reenable the TN and wait for an OVD message. If there is no OVD message, replace or repair the wiring between the console and the cross-connect terminal. If an OVD message is received, replace or repair the wiring between the IPE shelf and the cross-connect terminal. If there is still a console problem, reconnect all wiring and go to the next possible cause.
Defective backplane	Disable the TN. Unseat the affected IPE card. Reenable the TN and wait for an OVD message. If an OVD message is received, replace the card cage assembly in the module.

Symptom: Console cannot make or receive calls (no OVD message)

The attendant console cannot make or receive calls. There is no OVD message. There may be other system messages indicating that the TN for this console is defective or are disabled. See *Avaya Telephones and Consoles Fundamentals (NN43001-567)* for information about connecting attendant consoles. See *Avaya Communication Server 1000M and Meridian 1*

Large System Installation and Commissioning (NN43021-310) for information about system cabling.

Possible cause	Action
No power to console	Check the power supply and wiring to see that the console is powered up. If there is a power supply problem, correct it. If there is no power problem, go to the next possible cause.
Defective console	Test the console by entering: `LD 31` See *Avaya Software Input Output Reference – System Messages (NN43001-712)* for information about testing consoles with LD 31. If the console fails the test, replace it. If the console passes the test, go to the next possible cause.
Console connected to wrong TNs	Check the cross-connect terminal to make sure the console is connected to the correct TNs. If the console is not connected correctly, fix the wiring. If the console is connected correctly, go to the next possible cause.

Disabled TN	Software-disable and reenable each TN:
	`LD 32 DISU l s c u ENLU l s c u` l s c u = loop, shelf, card, unit
	Test TNs on superloops by entering:
	`LD 30 UNTT l s c u`
	Test TNs on other loops by entering:
	`LD 45 TEST`
	If there is still a console problem, go to the next possible cause.

Defective wiring	Make sure wiring is properly connected and wires are not interchanged, crossed, or grounded: • Check the wiring between the console and the cross-connect terminal. • Check the wiring between the IPE shelf and the cross-connect terminal. If there is a wiring problem, correct it.

Symptom: Indicator or digit display not functioning properly

The attendant console operates, but some LCD indicators or digit displays are not functioning properly. See *Avaya Telephones and Consoles Fundamentals (NN43001-567)* for information about connecting attendant consoles.

Possible cause	Action
Disconnected or defective power supply	Make sure the required power supplies to the attendant console are connected and are not defective. If there is still a console problem, go to the next possible cause.

Possible cause	Action

Disabled TN	Software-disable and reenable each TN:
	`LD 32 DISU l s c u ENLU l s c u` l s c u = loop, shelf, card, unit
	Test TNs on superloops by entering:
	`LD 30 UNTT l s c u`
	Test TNs on other loops by entering:
	`LD 45 TEST`
	If there is still a console problem, go to the next possible cause.

Feature not assigned	Make sure the feature or the indicator is assigned in software see *Avaya Software Input Output Maintenance (NN43001-711)*. If there is still a console problem, go to the next possible cause.
Defective console	Test the console by entering: `LD 31` See *Avaya Software Input Output Reference – System Messages (NN43001-712)* for information about testing consoles with LD 31. If the console fails the test, replace it.

Symptom: Operator cannot hear or be heard properly

The attendant console operates, but the user cannot hear or be heard properly. See *Avaya Telephones and Consoles Fundamentals (NN43001-567)* for information about connecting attendant consoles. See *Avaya Communication Server 1000M and Meridian 1 Large System Installation and Commissioning (NN43021-310)* for information about system cabling.

Possible cause	Action
Defective headset or handset	Make sure the handset or headset is plugged into the correct jack on the console. Try another handset or headset. If the test equipment works, replace the faulty handset or headset. If there is still a console problem, go to the next possible cause.
Defective console	Test the console by entering: `LD 31` Follow the procedures in *Avaya Software Input Output Reference – Maintenance (NN43001-711)* to test consoles with LD 31. If the console fails the test, replace it. If the console passes the test, go to the next possible cause.
Defective IPE card	software-disable each TN by entering: **`LD 32 DISU l s c u`** l s c u = loop, shelf, card, unit Disconnect the wiring between the IPE card and the cross-connect terminal. Reenable and test each TN by entering: `ENLU l s c u` Wait for an OVD message.

Possible cause	Action
	If an OVD message is received indicating a problem with the card or unit, replace the card. If there is no message indicating a problem with the card or unit, reconnect the wiring and go to the next possible cause.
Defective wiring to console	Make sure wiring is properly connected and wires are not interchanged, crossed, or grounded: • Check the wiring between the console and the cross-connect terminal. • Check the wiring between the IPE shelf and the cross-connect terminal. If there is a wiring problem, correct it.

Chapter 12: Clearing telephone faults

Contents

This section contains information on the following topics:

Telephone faults

Telephones and terminals are the user's interface to the system and its features. Components that can cause a telephone fault are:

- the telephone itself or add-on units
- the telephone power supply
- the building wiring
- the cross-connect from the telephone to the line circuit
- the unit on the peripheral line card
- the peripheral line card
- the ringing generator
- the peripheral controller card
- the peripheral module power
- the peripheral module backplane

Telephones and terminal faults typically affect only a single user. However, if more than one telephone is affected, look for the following connections, among others:

- they are on the same line card
- they are on the same module
- they are on the same loop

- they are served by the same peripheral controller
- there is a problem with ringing or tones

Use the following software programs and tests to isolate telephone faults:

- LD 30 to test network loops
- LD 31 to test sets and consoles
- LD 32 to test peripheral controllers
- LD 45 to perform signaling tests
- Meridian Modular Telephone (M2006, M2008, M2016S, and M2616) self-test

Fault clearing procedures

Table 14: Telephone fault indicators on page 96 lists common telephone fault indications. Refer to How to clear faults on page 29 for complete fault clearing process.

Table 14: Telephone fault indicators

Indicator	Possible indications
System messages	BSD501 ERR500 MWL500 NWS501 OVD001–002, 004, 005 XMI messages
Visual indicators	Red LED lit on associated cards
User reports	Trouble with calls Trouble with equipment (such as handset or add-on module)

⚠ Caution:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Telephone cannot make or receive calls (OVD message received)

The telephone cannot make or receive calls. There is an OVD message indicating that the TN for only this telephone are disabled. See *Avaya Telephones and Consoles Fundamentals (NN43001-567)* for information about connecting telephones. See *Avaya Communication Server 1000M and Meridian 1 Large System Installation and Commissioning*

(NN43021-310) for information about system cabling. It may be necessary to replace one of the following:

- IPE card
- telephone
- wiring between the cross-connect terminal and the telephone
- Wiring between the IPE shelf and the telephone
- CE/PE or IPE card cage: NT8D1103, NT8D1303, NT8D3703

Possible cause	Action
Defective IPE card	software-disable the TN indicated by the OVD message by entering: **`LD 32 DISU l s c u`** l s c u = loop, shelf, card, unit Disconnect the wiring between the IPE card and the cross-connect terminal. Reenable the TN by entering: `ENLU l s c u` and wait for an OVD message. If an OVD message is received indicating a problem with the card or unit, replace the card. If there is no OVD message indicating a problem with the card or unit, reconnect the wiring and go to the next possible cause.
Defective telephone	If the telephone is a Meridian Modular Telephone, enter: `LD 32 IDU l s c u` If there is no response, replace the telephone. If there is an appropriate response, continue this procedure. Disable the telephone TN. Disconnect the wiring from the telephone to the jack. Reenable the TN and wait for an OVD message. If there is no OVD message, replace the telephone. If an OVD message is received, reconnect the wiring and go to the next possible cause.
Defective wiring	Disable the TN. Disconnect the wiring between the telephone and the cross-connect terminal. Reenable the TN and wait for an OVD message. If there is no OVD message, replace or repair the wiring between the telephone and the cross-connect terminal. If there is still a problem with the telephone, reconnect all wiring and go to the next possible cause.
Defective backplane	Disable the TN. Unseat the affected IPE card. Reenable the TN and wait for an OVD message. If an OVD message is received, replace the card cage assembly in the module.

Telephone cannot make or receive calls (no OVD message)

The telephone cannot make or receive calls. There is no OVD message or other system message indicating the TN for this telephone is defective or disabled. There may or may not be dial tone when the handset is off-hook. See *Avaya Telephones and Consoles Fundamentals (NN43001-567)* for information about connecting telephones. See *Avaya Communication Server 1000M and Meridian 1 Large System Installation and Commissioning (NN43021-310)* for information about system cabling. To replace other equipment, see Replacing equipment on page 187.

Possible cause	Action
No power to digital telephone	Check the power supply (if one is required) and make sure it is not defective. If there is a power supply problem, correct it. If there is no problem with the power supply, go to the next possible cause.
Telephone connected to wrong TNs	Check the cross-connect terminal to make sure the telephone is connected to the correct TN. If the telephone is not connected correctly, fix the wiring. If the telephone is connected correctly, go to the next possible cause.

Disabled TN	Software-disable and reenable the telephone TN:
	`LD 32 DISU l s c u ENLU l s c u` l s c u loop, shelf, card, unit
	Test TNs on superloops by entering:
	`LD 30 UNTT l s c u`
	Test TNs on other loops by entering:
	`LD 45 TEST`
	If there is still a problem with the telephone, go to the next possible cause.

Defective telephone	Disconnect the telephone from the jack. Plug in another telephone of the same type. If the replacement telephone works, replace the telephone that was removed. If the replacement telephone does not work, reconnect the original telephone and go to the next possible cause. If the telephone is a Meridian Modular Telephone, enter: `LD 32 IDU l s c u` If there is no response, replace the telephone. If there is an appropriate response, see "Add-on modules" in *Avaya Telephones and Consoles Fundamentals (NN43001-567)* for self-test instructions.
Defective wiring	Make sure wiring is properly connected and wires are not interchanged, crossed, or grounded:

Possible cause	Action
	• Check the wiring between the telephone and the cross-connect terminal. • Check the wiring between the IPE shelf and the cross-connect terminal. If there is a wiring problem, correct it.

Symptom: One end cannot hear or be heard

The person at the far end can hear the caller but the caller cannot hear the person at the far end, or the person at the far end cannot hear the caller but the caller can hear person at the far end. See *Avaya Telephones and Consoles Fundamentals (NN43001-567)* for information about connecting telephones. See *Avaya Communication Server 1000M and Meridian 1 Large System Installation and Commissioning (NN43021-310)* for information about system cabling. To replace other equipment, see Replacing equipment on page 187. It may be necessary to replace one of the following:

- IPE card
- telephone handset
- Telephone
- Wiring to the telephone

Possible cause	Action
Fault on other equipment	Check with the user to determine if the fault is present only on: • certain types of calls (such as on a paging trunk or a Tie trunk). • calls to a specific location. • calls to a specific telephone or other piece of equipment (such as a modem or Fax machine). If the fault occurs only with certain calls, take the appropriate action. If the fault occurs on all calls, go to the next possible cause.
Defective handset	Check the receiver or transmitter in the handset. If one is defective, replace the handset or, if necessary, the telephone.
Defective telephone	Disconnect the telephone from the jack. Plug in another telephone of the same type. If the replacement telephone works, replace the telephone that was removed. If the replacement telephone does not work, reconnect the original telephone and go to the next possible cause. **Note:** If the telephone is a Meridian Modular Telephone, enter:

Possible cause	Action
	`LD 32 IDU l s c u` If there is no response, replace the telephone. If there is an appropriate response, see "Add-on modules" in *Avaya Telephones and Consoles Fundamentals (NN43001-567)* for self-test instructions.
Defective IPE card	software-disable the telephone TN by entering: **`LD 32 DISU l s c u`** l s c u = loop, shelf, card, unit Disconnect the wiring between the IPE card and the cross-connect terminal. Reenable and test the TN by entering: `ENLU l s c u` Wait for an OVD message. If an OVD message is received indicating a problem with the card or unit, replace the card. If there is no OVD a message indicating a problem with the card or unit, reconnect the wiring and go to the next possible cause.
Defective wiring to telephone	Make sure wiring is properly connected and wires are not interchanged, crossed, or grounded: • Check the wiring between the telephone and the cross-connect terminal. • Check the wiring between the IPE shelf and the cross-connect terminal. If there is a wiring problem, correct it.

Symptom: Noise or low volume on all calls

There is noise on the line on all calls or the volume is lower than usual on all calls. See *Avaya Telephones and Consoles Fundamentals (NN43001-567)* for information about connecting telephones. See *Avaya Communication Server 1000M and Meridian 1 Large System Installation and Commissioning (NN43021-310)* for information about system cabling. To replace other equipment, see Replacing equipment on page 187. It may be necessary to replace one of the following:

- IPE card
- telephone
- wiring to the telephone

Possible cause	Action
Defective wiring	Make sure wiring is properly connected and wires are not interchanged, crossed, or grounded:

Possible cause	Action
	• Check the wiring between the telephone and the cross-connect terminal. • Check the wiring between the IPE shelf and the cross-connect terminal. If there is a wiring problem, correct it. If there is no problem with the wiring, go to the next possible cause.
Defective telephone	Disconnect the telephone from the jack. Plug in another telephone of the same type. If the replacement telephone works, replace the telephone you removed. If the replacement telephone does not work, reconnect the original telephone and go to the next possible cause. **Note:** If the telephone is a Meridian Modular Telephone, enter: `LD 32 IDU l s c u` If there is no response, replace the telephone. If there is an appropriate response, see "Add-on modules" in *Avaya Telephones and Consoles Fundamentals (NN43001-567)* for self-test instructions.
Defective IPE card	software-disable the telephone TN by entering: **`LD 32 DISU l s c u`** where l s c u = loop, shelf, card, unit Disconnect the wiring between the IPE card and the cross-connect terminal. Reenable and test the TN by entering: `ENLU l s c u` Wait for an OVD message. If an OVD message is received indicating a problem with the card or unit, replace the card.

Symptom: Defective indicator, digit display, or component

The telephone can place and receive calls, but one or more LED or LCD indicators, digit displays, or components (such as a handsfree unit) are not working. See *Avaya Telephones and Consoles Fundamentals (NN43001-567)* for information about connecting telephones. To replace other equipment, see Replacing equipment on page 187. It may be necessary to replace one of the following:

- power supply to telephone
- IPE card
- telephone

Possible cause	Action
Telephone has incorrect software parameters	Disconnect and reconnect power to the telephone to force a reset and parameter download. If the fault is not cleared, go to the next possible cause.
No power to digital telephone	Check the power supply (if one is required) and make sure it is not defective. If there is a power supply problem, correct it. If there is no problem with the power supply, go to the next possible cause.
Defective telephone	Disconnect the telephone from the jack. Plug in another telephone of the same type. If the replacement telephone works, replace the telephone that was removed. If the replacement telephone does not work, reconnect the original telephone and go to the next possible cause. **Note:** If the telephone is a Meridian Modular Telephone, enter: `LD 32 IDU l s c u` If there is no response, replace the telephone. If there is an appropriate response, see "Add-on modules" in *Avaya Telephones and Consoles Fundamentals (NN43001-567)* for self-test instructions.
Feature not assigned	Make sure the feature or the indicator is assigned in software (see *Avaya Software Input Output Maintenance (NN43001-711)*.

Symptom: Defective feature

The telephone can make and receive calls, but one or more of its features (such as call transfer or ring again) is not working. See *Avaya Telephones and Consoles Fundamentals (NN43001-567)* for information about connecting telephones.

Possible cause	Action
Feature not assigned	Make sure the feature or the indicator is assigned in software (see *Avaya Software Input Output Maintenance (NN43001-711)*. If there is still a console problem, go to the next possible cause.
Defective telephone	Disconnect the telephone from the jack. Plug in another telephone of the same type. If the replacement telephone works, replace the telephone that was removed. If the replacement telephone does not work, reconnect the original telephone and go to the next possible cause.

Possible cause	Action
	Note: If the telephone is a Meridian Modular Telephone, enter: `LD 32 IDU l s c u` If there is no response, replace the telephone. If there is an appropriate response, see "Add-on modules" in *Avaya Telephones and Consoles Fundamentals (NN43001-567)* for self-test instructions.

Symptom: Defective add-on module

The telephone can make and receive calls, but an add-on module connected to it is not working. See *Avaya Telephones and Consoles Fundamentals (NN43001-567)* for information about connecting telephones. It may be necessary to replace one of the following:

- add-on module
- data option card
- power supply for add-on module

Possible cause	Action
Defective power supply for add-on module	If the add-on module requires a separate power supply, make sure it is properly connected and in working order. If there is still a problem with the telephone, go to the next possible cause.
Defective add-on module	Replace the add-on module.
Defective data option card	If the fault is with a data add-on module, replace the data option card.

Symptom: Cannot dial from 2500 telephone

A user cannot dial from a 2500 telephone. The condition may exist on more than one telephone and may be intermittent. The telephone may occasionally experience a "no dial tone" condition. Calls from other types of telephones are not affected. See *Avaya Telephones and Consoles Fundamentals (NN43001-567)* for information about connecting telephones. See *Avaya Communication Server 1000M and Meridian 1 Large System Installation and Commissioning*

(NN43021-310) for information about system cabling. To replace other equipment, see Replacing equipment on page 187. It may be necessary to replace one of the following:

- DTR card: NT8D16
- Tone Detector card: QPC422
- Network/DTR card: NT8D18
- telephone
- wiring to the telephone

Possible cause	Action
Defective telephone	If only one telephone is affected, replace it. If there is still a problem with the telephone, go to the next possible cause.
Defective wiring	If only one telephone is affected, make sure wiring is properly connected and wires are not interchanged, crossed, or grounded: • Check the wiring between the telephone and the cross-connect terminal. • Check the wiring between the IPE shelf and the cross-connect terminal. If there is a wiring problem, correct it. If there is still a problem with the telephone, go to the next possible cause.
Defective digitone receiver	If the condition is intermittent or more than one telephone is affected, test the digitone receivers in the system by entering: **`LD 34 DTR l s c u`** where l s c u = loop, shelf, card, unit of the DTR. Replace any units that fail the test. If there is still a problem with the telephone, go to the next possible cause.
Excessive Digitone traffic	Additional digitone receivers may be required to handle the traffic in the system. See *Avaya Traffic Measurement: Formats and Outputs Reference (NN43001-750)*.

Symptom: No ring on 500 and 2500 telephones

Both 500 and 2500 telephones do not ring. One or several sets in the same module are experiencing the problem. See *Avaya Telephones and Consoles Fundamentals (NN43001-567)* for information about connecting telephones. See *Avaya Communication Server 1000M and Meridian 1 Large System Installation and Commissioning*

(NN43021-310) for information about system cabling. To replace other equipment, see Replacing equipment on page 187. It may be necessary to replace one of the following:

- Ringing generator: NT6D42, NT8D21
- IPE card
- telephone
- wiring to the telephone
- CE/PE or IPE card cage: NT8D1103, NT8D1303, NT8D3703

Possible cause	Action
Defective telephone	If only one telephone is affected, replace it. If there is still a problem with the telephone, go to the next possible cause.
Defective wiring	If only one telephone is affected, make sure wiring is properly connected and wires are not interchanged, crossed, or grounded: • Check the wiring between the telephone and the cross-connect terminal. • Check the wiring between the IPE shelf and the cross-connect terminal. If there is a wiring problem, correct it. If there is still a problem with the telephone, go to the next possible cause.
Defective IPE card	Software-disable the telephone TN by entering: **`LD 32 DISU l s c u`** "l s c u" represents loop, shelf, card, and unit numbers. Disconnect wiring between the IPE card and the cross-connect terminal. Reenable and test the TN by entering: `ENLU l s c u` Wait for an OVD message. If an OVD message is received indicating a problem with the card or unit, replace the card. If there is no a message indicating a problem with the card or unit, reconnect the wiring and go to the next possible cause.
Defective controller card	If several telephones on different cards in the same loop are affected, replace the controller card. If there is still a problem with the telephone, reinstall the original controller card and go to the next possible cause.
Defective ringing generator	If several telephones on different cards in the same module are affected, replace the ringing generator for the shelf (even if the green LED on the unit is lit). If there is still a problem with the telephone, reinstall the original ringing generator and go to the next possible cause.

Possible cause	Action
Defective backplane	If the green LED is lit on the ringing generator and the fault persists, replace the card cage assembly in the module.

Chapter 13: Clearing IP telephone faults

Contents

This section contains the following topics:

UNIStim Security with DTLS

UNIStim Security with Datagram Transport Layer Security (DTLS) provides signaling encryption for UNIStim IP Phones based on the industry standard DTLS protocol (RFC4347):

- Industry standard DTLS protocol to encrypt UNIStim signaling
- Possible configurations can include both DTLS-capable and DTLS-incapable systems on the same network
- Each LTPS can have its own certificate if the IP phones validate it.
- All platforms that run Line TPS (signaling servers and media cards) support DTLS; therefore, you need not install additional hardware.
- DTLS encryption can co-exist with SMCs, so you can simultaneously use both types of encryption on a single system
- All systems in the network must be DTLS enabled to communicate with vaya Communication Server 1000 with DTLS for signalling security

IP Phone registration faults related to DTLS

IP Phone registration problems related to DTLS can be caused by the following problems:

- certificate validations
- improper firewall configurations

IP Phone registration can fail if the IP Phone does not support DTLS.

Symptom: Displays Terminal Manager Connect

A phone configured for switchover mode (action byte 1) attempts to register with the LTPS, prompts for node ID and TN, displays “Terminal Manager Connect” and then “Server Unreachable". No error messages on the LTPS is generated.

Possible cause	Action
A firewall between the phone and the LTPS that prevents communication on the UDP port 5101.	Allow UDP traffic on port 5101 on the firewalls.

Symptom: Displays Server Unreachable

A phone configured for switchover mode (action byte 1) or Secure Handshake (action byte 7) mode attempts to register with the LTPS and displays “Server Unreachable”. No error messages on the LTPS is generated.

Possible cause	Action
Node DTLS policy is configure to “DTLS Always”.	Configure the node DTLS policy to “DTLS Best Effort” or reconfigure the phone to use the Secure Handshake mode.
A firewall exists between the phone and LTPS that prevents communication on UDP ports 4101, 7301, 5101. Node DTLS policy is configure to “DTLS Off”.	Allow the UDP traffic on ports 4101, 7301, 5101 on the firewalls. Configure the node DTLS policy to “DTLS Best Effort” or “DTLS Always”

Symptom: DTLS handshake error - bad server certificate. Client IP = xx.xx.xx.xx

A phone configured for switchover mode (action byte 1) or Secure Handshake mode (action byte 7) attempts to register with the LTPS, prompts for node ID and TN, displays “Terminal Manager Connect” and then “Security Error.” The LTPS logs “DTLS handshake error - bad server certificate. Client IP = xx.xx.xx.xx.”

Possible cause	Action
The phone cannot validate the certificate of the server.	Ensure the trusted certificate list of the phone contains one of the certificates from the LTPS certificate signing chain. For more information, see *Avaya Signaling Server IP*

Possible cause	Action
	Line Applications Fundamentals, NN43001-125.
Mutual authentication is on and the server cannot validate the certificate of the phone.	Ensure the trusted certificate list of the LTPS contains one of the certificates from the IP Phone certificate signing chain. For more information, see *Avaya Unified Communications Management Fundamentals, NN43001-116*. OR Turn off the Mutual Authentication by using Element Manager.

Chapter 14: Simple Network Management Protocol

Contents

This section contains information about the following topics for Avaya Communication Server 1000 (Avaya CS 1000) and Meridian 1 systems:

Introduction

MIBs

In typical IP network devices, the operator requires a large amount of management information to properly run the device. This information is kept on the system and can be made available to network management systems through Simple Network Management Protocol (SNMP). The information itself is kept on the device (conceptually) in a database, referred to as a Management Information Base (MIB). The network management system can query the MIB through SNMP query commands (called **gets**), and in some cases can write into the MIB through SNMP **set** commands.

For the Network Management System (NMS) to communicate with the agent on a managed device, the NMS must a description of all manageable objects the agent knows about. Therefore, each type of agent has an associated document, called a MIB Module, which contains these descriptions. MIB Module files are loaded into the NMS. MIB Modules are frequently referred to as "MIBs". The primary purpose of the MIB module is to provide a name, structure and a description for each of the manageable objects a particular agent knows about.

The NMS uses two kinds of MIB modules:

- a generic MIB Module that describes the structure of the data that can be retrieved by the NMS
- a trap MIB Module that describes the structure of the data sent by the device agent as an SNMP trap

MIB data is arranged in a tree structure. Each object (each item of data) on the tree has an identifier, called an Object ID (OID), which uniquely identifies the variable. To prevent naming conflicts and provide organization, all major device vendors, as well as certain organizations, are assigned a branch of this tree structure (referred to as the "MIB Tree"). The MIB Tree is managed by the Internet Assigned Numbers Authority (IANA). Each object on the MIB Tree has a number and a name, and the complete path from the top of the tree down to the point of interest forms the name.

An SNMP MIB must be written in Abstract Notation One (ASN.1) format to conform with the SNMP standards.

Configuration

Use tools such as the Command Line Interface (CLI) and Element Manager to configure SNMP elements for a system. The tool you use depends on the system platform (CS 1000E, CS 1000M, or Meridian 1) and the network device. See the following table.

Table 15: SNMP elements and where they are configured

SNMP configuration of…	CLI	Element Manager
Call Server		
Community name strings (Note 1)	Yes	Yes
Trap destinations	Yes	No
sysgroup MIB info	Yes	Yes
EDT/EPT edits	Yes	No

SNMP configuration of…	CLI	Element Manager
Signaling Server		
Community name strings	See Note 1.	See Note 1.
Trap destinations	No	Yes
sysgroup MIB info	No	Yes
Media Cards		
Community name strings	See Note 1.	See Note 1.
Trap destinations	No	Yes
sysgroup MIB info	No	Yes
Note: Propagated to the Signaling Server and Media Cards on EDD. **Note:** On a Meridian 1, TM is used to provision the Media Cards and other ITG devices. **Note:** On a Meridian 1, TM can use the same values as for the Call Server.		

Supported MIBs

Table 16: Supported MIBs on page 113 lists the standard and enterprise-specific MIBs supported for each device.

Table 16: Supported MIBs

Component	Standard MIB	Enterprise-specific MIB
Call Server	• System group (RFC 1213) • Interface group (RFC 2863) • IP group (RFC 2011) • UDP group (RFC 2013) • TCP group (RFC 2012) • ICMP group (RFC 2011) • SNMP group (RFC 3418) • Entity group (RFC 2737) (only the following two sub-groups) - Physical	• Trap group – Rel 4_0 Call Server trap.mib

Component	Standard MIB	Enterprise-specific MIB
	- General	
Signaling Server	• System group (RFC 1213) • Interface group (RFC 2863) • IP group (RFC 2011) • UDP group (RFC 2013) • TCP group (RFC 2012) • ICMP group (RFC 2011) • SNMP group (RFC 3418)	• Trap group – Rel 4_0 Sig Server trap.mib • Zonetrafficrpt group – zonetrafficrpt.mib
Media Card	• System group (RFC 1213) • Interface group (RFC 2863) • IP group (RFC 2011) • UDP group (RFC 2013) • TCP group (RFC 2012) • ICMP group (RFC 2011) • SNMP group (RFC 3418)	• Trap group – Rel 4_0 IP Line trap.mib

MIB security

For security purposes, read and write community name strings are used to control access to all MIB data.

Configuration of system group MIB parameters

Commands are added to LD 117 to modify the parameters for MIB groups. This includes the parameters needed for the system group MIB (1.3.6.1.2.1.1). The system group provides the basic information about the identity of the system such as system name, system location, and system contact. By default, a set of variables is defined for the system group MIB, but they are also configurable in LD 117, as shown in Table 17: LD 117 - Configure system group MIB parameters on page 115.

Both the standard MIB read-only community name string and the enterprise-specific MIB community name strings (public, admingroup2, and admingroup3) are defined by default. However, they can also be configured in LD 117.

The system group MIB parameters and the community name strings are configured on the Call Server and synchronized to the Signaling Server and the Media Cards when a data dump is performed. As well, they are synchronized when a link is established between a Signaling Server or Media Card and the Call Server.

Table 17: LD 117 - Configure system group MIB parameters

Command	Description
CHG NAV_SITE *aa... a*	Change the navigation site name (for example, MyCity) where: aa...a = a string with maximum length of 32 characters default = Navigation Site Name To clear the field, enter **X**.
CHG NAV_SYSTEM *aa... a*	Change the navigation site name (for example, Station Switch) where: aa...a = a string with a maximum length of 32 characters default = Navigation Site Name To clear the field, enter **X**.
CHG SNMP_SYSCONTACT *aa... a*	Change the contact person name for this machine where: aa...a = a string with a maximum length of 100 characters default = System Contact To clear the field, enter **X**.
CHG SNMP_SYSLOC *aa...a*	Change the defined physical location for this machine where: aa...a = a string with a maximum length of 100 characters default = System Location To clear the field, enter **X**.
CHG SNMP_SYSNAME *aa...a*	Change the name assigned to this machine where: aa...a = a string with a maximum length of 100 characters default = Navigation Site Name: Navigation System Name: Hostname To clear the field, enter **X**.
CHG SNMP_SYSNAME NAV	Revert the name assigned to this machine to the default name. The default name is comprised of the currently configured <NAV_SITE> : <NAV_SYSTEM> : <HOSTNAME>.
CHG ADMIN_COMM *n aa...a*	Change the admin groups community name string, where: n = a number from 1 to 32 aa...a = a string with a maximum length of 32 characters

Command	Description
	Default(1) = public Default(2) = admingroup2 Default(3) = admingroup3 These communities are used for accessing different SNMP objects on the Call Server, Signaling Servers, and Media Cards.
CHG SYSMGMT_RD_COMM *aa...a*	Change the system management read-only community name string where: aa...a = a string with a maximum length of 32 characters
CHG SYSMGMT_WR_COMM *aa...a*	Change the system management read/write community name string where: aa...a = a string with a maximum length of 32 characters

Important:

IMPORTANT!

Changes made to the NAV_SITE, NAV_SYSTEM, and HOSTNAME are not automatically propagated to the SNMP_SYSNAME. The CHG SNMP_SYSNAME NAV command **must** be used.

The data dump (EDD) command saves the configurable system group MIB parameters and community name strings to a file called syscfg.db, which is saved at /u/db.

For more detailed information about configuring MIBs, see *Avaya Communication Server 1000 Fault Management – SNMP (NN43001-719)*.

Print commands

Printing the system group MIB parameters and community name strings is done through LD 117, as shown in the following table.

Table 18: LD 117 - Print system group MIB parameters and community name strings

Command	Description
PRT NAV_SITE	Print the navigation site name.
PRT NAV_SYSTEM	Print the navigation system name.
PRT SNMP_SYSGRP	Print all parameters of the MIB system group.
PRT ADMIN_COMM	Print the administration group read-only community name strings.
PRT SYSMGMT_COMM	Print the system management community name strings

Config.ini file

Because the community name strings are synchronized when a link is established between a Signaling Server/Media Card and the Call Server, the IP Telephony devices no longer read the config.ini file to retrieve the community strings. Therefore the community name strings are removed from the config.ini file.

Traffic MIB

The Zonetrafficrpt MIB on the Signaling Server handles traffic report parameters generated on the Call Server. The SNMP manager sends an SNMP query to the Signaling Server to retrieve the Zonetrafficrpt parameters. The Signaling Server communicates with the Call Server to retrieve the information from the traffic report and respond to the SNMP query. The SNMP agent on the Signaling Server incorporates the Zonetrafficrpt MIB and handles SNMP queries to the Zonetrafficrpt MIB. The Zonetrafficrpt parameter values from the Call Server are transferred to the Signaling Server. On the Call Server, the Zonetrafficrpt parameters are accessed through LD 2 and LD 117.

The Zonetrafficrpt MIB consists of traffic parameters for a zone provisioned on the Call Server. The two sets of parameters are intra-zone parameters and inter-zone parameters. Each parameter is assigned an object ID in the MIB. For further information about the Zonetrafficrpt traffic parameters that are available, refer to *Avaya Communication Server 1000 Fault Management – SNMP (NN43001-719)*.

Community name strings

Read-only and read/write community name strings control access to all MIB data. A community name string is defined by default to access standard MIBs. A set of administrator community name strings is supported with read-only privileges, with the default strings of "public", "admingroup2", and "admingroup3". The first and third community name strings provide access to system group MIB variables, while the second community name string provides access to all MIBs.

New commands are created in LD 117 to configure MIB community name strings for read-only access to Call Server MIBs (system group MIB objects) and for read/write access to Signaling Server/Media Card MIBs. Table 19: Call Server community name strings on page 118 lists the Call Server community name strings. Table 20: Signaling Server/Media Cards community name strings on page 118 lists the Signaling Server/Media Card community name strings.

Table 19: Call Server community name strings

Community Name (User group)	Access privileges	Network Interface	View	Where configured
ADMIN_COMM(1) (public)	read	ELAN	system group MIB	LD 117
ADMIN_COMM(2) (admingroup2)	read	ELAN	All MIBs	LD 117
ADMIN_COMM(3) (admingroup3)	read	ELAN	system group MIB	LD 117
SYSMGMT_RD_COMM (otm123)	read	ELAN	All MIBs	LD 117
SYSMGMT_WR_COMM (otm321)	read/write	ELAN	CorpDir MIB	LD 117

Table 20: Signaling Server/Media Cards community name strings

Community Name (User group)	Access privileges	Network Interface	View	Where configured
ADMIN_COMM(1) (public)	read	ELAN	system group MIB	LD 117
ADMIN_COMM(2) (admingroup2)	read	ELAN	All MIBs	LD 117
ADMIN_COMM(3) (admingroup3)	read	ELAN	Zonetrafficrpt MIB (Signaling Server only) system group MIB (Media Cards only)	LD 117

Community name strings used by the Signaling Server and Media Cards are synchronized from the Call Server to the Signaling Server and Media Cards when a data dump is performed. They are also synchronized when a link is established between a Signaling Server or Media Card and the Call Server.

Test Alarm utility

The Test Alarm utility simulates an alarm to verify that the alarms are generated correctly and sent to their configured destinations. The alarm is sent to the trap destination list configured on the system in LD 117 and the Open Alarm feature.

The TEST ALARM command creates and sends an open_alarm (trap type 10) to the trap destination list and displays a message on the console. The alarm test utility sends a trap for any parameter specified.

The message travels through the following:

- Event Default Table (EDT) to assign correct severity if system message is valid; otherwise, system message is assigned a severity of Info
- Event Preference table (EPT) to modify severity or suppress system message based on threshold

If the Test Alarm utility uses a valid system message and correctly sends a trap to the trap destination, the same system message, if it occurs on the system, is not guaranteed to be sent as a trap. Some system messages currently do not generate a trap. The LD 117 TEST ALARM command is described in the following table.

Table 21: LD 117 - Test alarm command

=> Command	Description
TEST ALARM *aaaa nnnn*	Generate an alarm where: *aaaa* = any character sequence. However, to test how an existing system message category (for example, BUG, ERR, INI) would appear in an alarm browser, use an existing system message. *nnnnn* = any numeric sequence (for example, 3458) and is optional, defaulting to 0000 The actual output on the TTY is the system message passed as the parameter; for example: BUG1234 The actual trap sent to the trap destination list is trap type 10 with the following details: operator description = This is a test operator data = This is a test error code = aaaannnn The rest of the binding variables are NULL.

EDT and EPT

The Event Default Table (EDT) and Event Preference Table (EPT) are repositories on the Call Server for storing system event information.

The EDT contains a list of system events that are generated on the system. Each event contains an event code, a description, and severity information. The EPT is used to override the severity of an event assigned in the EDT. The EPT can also be used to set escalation thresholds and suppression thresholds for certain event severities.

The number of entries allowed in the EPT is 500.

To import and export an EPT file from/to removable media, to load an updated EPT file into memory, and to print the entries in the EDT and EPT, see the following table.

Table 22: LD 117 - EDT and EPT commands

Command	Description
EXPORT EPT	The EPT file stored on the hard disk (/u/db/ smpserv.db) is copied to the floppy/PC Card drive (a:/smpserv.db).
IMPORT EPT	The EPT file stored on the floppy/PC Card (a:/smpserv.db) drive is copied to the hard drive (/u/db/smpserv.db).
RELOAD EPT	The new/modified EPT file is loaded into memory from disk (/u/db/ smpserv.db).
PRTS EPT severity <eventID> <eventID>	The entries in the EPT can be listed based on the severity field for all entries or the specified range of entries.
PRTS EDT severity <eventID> <eventID>	The entries in the EDT can be listed based on the severity field for all entries or the specified range of entries.

Error messages are issued if the import or export of the EPT file was not successful.

Backup and restore

LD 43

To backup and restore Call Server system group MIB variables, System Navigation variables, and community name strings, see the following table.

Table 23: LD 43 - Backup and restore commands

Command	Description
EDD	The Call Server system group MIB variables, System Navigation variables, and community name strings are dumped to disk as a file. This file is backed up to the A: drive floppy.

Command	Description
BKO	The new file created to store the system group MIB variables, System Navigation variables, and community name strings is copied from the primary device to the backup (external storage) device.
RES	The new file created to store the system group MIB variables, System Navigation variables, and community name strings is restored from the backup (external storage) device to the primary device.

LD 143 Large systems

To backup and restore system group MIB variables, System Navigation variables, and community name strings with floppy disks, see the following table. These LD 143 commands are specific to the Large System.

Table 24: LD 143 - Large System backup and restore using floppy disks

Command	Description
ABKO	The new file created to store the system group MIB variables, System Navigation variables, and community name strings is backed up to floppy disks.
ARES	The new file created to store the system group MIB variables, System Navigation variables, and community name strings is restored from floppy disks.

Customer Configuration Backup and Restore

Communication Server 1000, Release 5.0 introduced the Customer Configuration Backup and Restore (CCBR) feature to the large system. With this feature you can:

- access the system onsite or remotely
- back up the customer configuration database to a remote PC or external storage
- restore or update the customer configuration database when the system is operating
- restore or update the customer configuration database when the system is not operating

Equipment requirements

You require the following equipment to use CCBR:

- a computer that supports Xmodem communications protocol

  Ensure that your communications package complies with the protocol specifications in *Avaya Communication Server 1000E Installation and Commissioning (NN43041-310)*.

Not all Xmodem protocols are identical. Some may not operate properly with the CCBR feature.

- modems for remote access

To access the system remotely, connect a modem to a Serial Data Interface (SDI) port on the CP PM Call Server.

To access the system locally, connect a computer directly to an SDI port on the CP PM card.

To access the system remotely, connect a modem to port 0 of the 2-port SDI cable (NTAK19EC) attached to the MDF connector for the CP PM card slot.

To access the system locally, connect a terminal directly to port 0 of the 2-port SDI cable (NTAK19EC) attached to the MDF connector for the CP PM card slot.

Feature operation

Backing up the customer configuration database

1. Log on to the system.
2. Perform a data dump in LD 43 (EDD).
3. When the data dump is successful, exit LD 43 (****).
4. Type **`LD 143`**.

   The system responds:

   `CCBR000 .`

   Important:

   Review Steps 5 through 7 before you proceed. If you do not complete these steps within approximately 5 minutes after you issue the **`XBK`** command, the system times out.
5. Type **`XBK`**.

   The system responds with the following: `INFO: total packets : xxx number of retries : 0 receive timeouts : 0 system errors : 0 unknown characters : x transfer cancelled : 0 packets received out of sequence : 0 packets with corrupted sequence : 0 packets failed checksum/crc check : 0 incomplete packets : 0 duplicate packets : 0`
6. Enter a header name for the configuration data backup file and press `Return`. Enter up to 128 characters of text, including spaces, carriage returns, and line feeds.

   If you enter more than 128 characters, the system exits text entry mode and responds with R> .
7. If you do not want to enter any text, press `Return`.

The system responds with `R>` , indicating that it is ready to continue.

Important:

You must complete the next step within 2 minutes, or the system times out. If a timeout occurs, return to Step 5 and retype the **XBK** command.

8. To receive the configuration database file, use the Xmodem protocol. The file arrives in binary format.

   For information about receiving files, see the manual supplied with your communications software package.

9. Wait for the file transfer operation to end. File transfer time depends on database size and baud rate. When the file transfer is completed successfully, the system responds `OK` .

10. If the file transfer fails, the system responds with one of the following:

BKP0003	Indicates that some of the transferring data is invalid. Data transfer is not attempted. Corrective action: Repeat the backup procedure from the beginning (**EDD**).
BKP0008	Indicates that the data transfer is interrupted by a system timeout or by a line problem, such as excessive noise. Corrective action: Repeat the procedure from Step 5 (**XBK**).

11. The configuration database backup procedure is complete. Type ******** to exit the program.

Restoring or updating the configuration database (system operating)

1. Type **LD 143**.

2. The system responds:

   `CCBR .`

3. Type **XRT** to begin the configuration database restore.

   The system prepares to receive the database file from the computer and restore it to the call processor.

4. The system responds:

   `WAIT - - 2 MINUTES R>`

   Warning:

   The receiving medium is erased at the start of this step. If a problem occurs during the restore procedure, do not leave the system in this state. Repeat the restore procedure. If you still encounter problems, do an EDD to dump the current data to the call processor.

5. Send the backup database file to the system by using the communications software and the XModem protocol on the computer.

The system displays the character C every 3 seconds until the file transfer is complete. To avoid a system timeout, the file transfer must be complete before the character C appears 20 times (approximately 1 minute).

The system site ID contained in the configuration database records being sent is compared to the ID on the system. If the IDs do not match, the data is still restored, but the following warning message appears:

`BKP0011`	Indicates that the site ID in the restored data does not match that of the system. This response is normal when you use this procedure as part of an installation process. Corrective action: Ensure that the customer data file is the correct one and that you are not restoring the wrong file to the system. If the file is correct, contact Avaya technical support.

When the database restore is successful, the system responds: `OK`

6. If the database restore fails, the system sends one of the following messages:

`BKP0004`	Indicates a failure to erase the Call Server file. Corrective action: Repeat the restore procedure. If the procedure fails again: For CP PII and CP PIV Call Servers, the probable cause is a faulty flash ROM. For CP PM Call Servers, contact Avaya technical support.
`BKP0003`	Indicates that the received file contains invalid data. Corrective action: Check the transmitted data file to ensure that it is the correct one. Repeat the restore procedure (**XRT** command). If the procedure fails again, a corrupted data file is a probability.
`BKP0008`	Indicates that a transmission error occurred due to a timeout or excessive line noise. Corrective action: Repeat the procedure.

7. Reboot or sysload the system.

   Important:

   Using the STAD command

   Effective from CS 1000 Release 5.0, only users having SEC_ADMIN privileges can change the system time and date. For more information about security enhancements, see *Avaya Security Management Fundamentals, NN43001-604*.

8. Reset the correct time and date: **`LD 2 STAD (day) (month) (year) (hour) (minute) (second)`**
9. Check the time and date entered: **`TTAD`**
10. Customer configuration database restore is complete. To exit LD 43, type **`****`**.

More information

For more detailed information about SNMP, refer to *Avaya Communication Server 1000 Fault Management – SNMP (NN43001-719)*.

Chapter 15: Proactive Voice Quality Management

Contents

This section contains information about the following topics for Avaya Communication Server 1000 (Avaya CS 1000) and Meridian 1 systems:

Introduction

Proactive Voice Quality Management (PVQM) includes:

- Monitoring of voice-quality metrics (for example, latency, jitter, packet loss, and R-Value) for the IP Phone and voice gateway endpoints.
- Threshold configuration (for example, Warning and Unacceptable) of voice-quality metrics in LD 117. Thresholds are used to classify system performance as good, poor, and unacceptable.
- SNMP alarm generation when voice-quality metric thresholds are violated on a per-call or bandwidth zone basis.
- Voice quality related SNMP alarm control, on a zone basis, by configuring Alarm Notification Levels in LD 117. Alarm control assists in isolating voice-quality problems and reducing network traffic.
- Recording of voice-quality metric threshold violations in Traffic Report 16. Traffic Report 16 is accessible in LD 2 and SNMP MIB.
- Retrieval of Operational Measurement (OM) reports containing hourly summations of the voice-quality metrics and endpoint registration activity. R-Value information is now available in OM reports.
- Network diagnostic utilities to identify, isolate, and report network problems affecting voice quality. The diagnostic utilities are available by using the CLI or IP Phones with Phase 2 software. The utilities include Traceroute, Ping, Ethernet statistics, IP Network statistics, UNIStim/Reliable User Data Protocol (RUDP) statistics, Real-Time Control Protocol (RTCP) statistics, and Dynamic Host Control Protocol (DHCP) data.

PVQM assists network administrators and craft persons to:

- Make informed decisions for capacity planning and Quality of Service (QoS) network engineering.
- Monitor the performance of their systems.
- Diagnose, isolate, and correct networking problems that cause deterioration in voice quality.

How voice quality monitoring works

The PVQM feature monitors voice quality by polling IP endpoints during a call. At the end of a call, the following voice-quality metrics are sampled:

- Latency - the length of time needed for information to travel through the network, value expressed in seconds
- Jitter - the variability in latency, value expressed in seconds
- Packet Loss - the number of packets lost during transmission, value expressed in percentage
- R-Value - measurement of audio quality using ITU E-Model

The sampled metrics are compared to user-configured thresholds in order to determine system performance. When sampled metrics exceed configured thresholds, statistics are generated on the system.

For details on configuring metric thresholds, see LD 117 - Configure voice-quality metric thresholds on page 132.

Statistics for each metric are collected on the Signaling Server or Voice Gateway Media Card to create a Quality Detail Report (QDR). The QDR summarizes metric threshold violations into one of the following categories:

- Warning
- Unacceptable

Each summarized QDR record is added to the IP Phone Zone Traffic Report 16. The enhanced traffic report summarizes the voice quality over the reporting period on a zone-by-zone basis to allow the administrator to view the overall voice quality.

An SNMP alarm is generated when a voice-quality metric threshold exceeds Warning or Unacceptable status. For details on controlling the number of SNMP alarms generated, refer to LD 117 - Configure zone alarm-notification levels on page 134.

Figure 8: Voice-quality monitoring flow diagram on page 130 illustrates PVQM within the Voice over IP (VoIP) system.

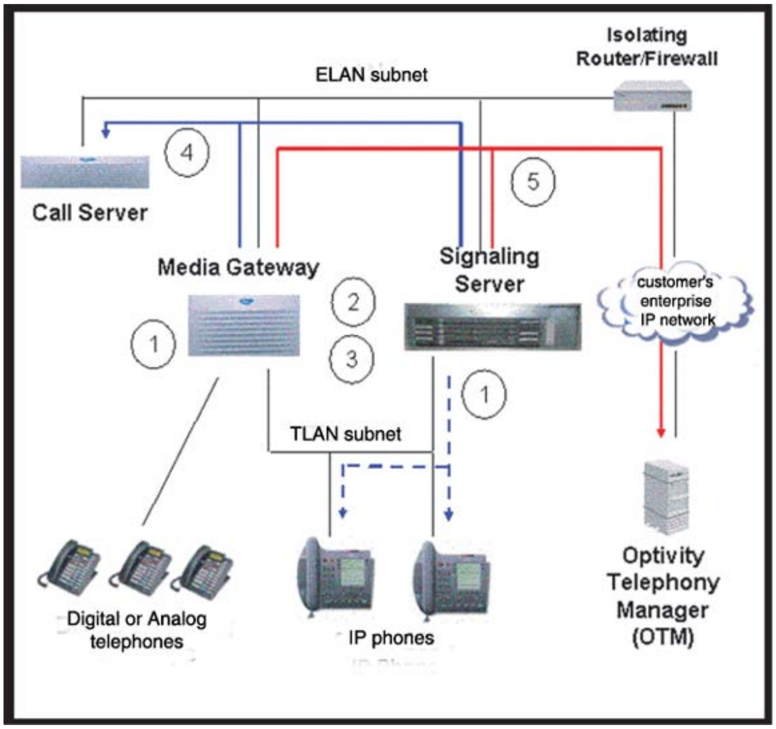

Figure 8: Voice-quality monitoring flow diagram

Legend

1. IP Phones and endpoints are polled during a call, and at the end of a call, to extract voice-quality statistics.
2. Statistics for each metric are collected on the Signaling Server or Voice Gateway Media Card.
3. Voice-quality statistics are compared to threshold settings and a QDR is created.
4. The QDR is forwarded to the Call Server for reporting purposes.
5. An SNMP alarm is generated when voice-quality metric exceeds the Warning or Unacceptable threshold.

Feature packaging

Monitoring of all other voice-quality metrics is available with base CS 1000 Release 5.5 software. To enable monitoring of the R-Value audio quality metric, the Proactive Voice Quality Management (PVQM) package 401 is required.

Supported system types

PVQM is supported by CS 1000 Release 5.5 and Meridian 1 systems equipped with Voice Gateway Media Cards running IP Line 4.0.

Feature implementation

The system implements this feature during an installation or upgrade to the PVQM_401 software package, available from Feature Service Level 2 - Enhanced Business Services.

Task summary list

The following is a summary of the tasks in this section:

LD 117 - Print zone QoS IP statistics

Table 25: LD 117 Print Zone QoS IP statistics on page 131 shows the LD 117 commands that display QoS IP statistics for zones, ordered by attribute or by zone. Traffic Report 16 contains similar information and a list of attributes. For more information about traffic reports, see *Avaya Traffic Measurement: Formats and Outputs Reference (NN43001-750)*.

Table 25: LD 117 Print Zone QoS IP statistics

Command	Description
AQOS <attribute> <zone>	Print QoS IP statistics by attribute for a specific zone.
AQOS <attribute> ALL	Print QoS IP statistics by attribute for all zones.
ZQOS <zone> <attribute>	Print QoS IP statistics by zone for a specific attribute.

Command	Description
ZQOS <zone> ALL	Print QoS IP statistics by zone for all attributes.

LD 117 - Configure voice-quality metric thresholds

To configure voice-quality metric thresholds on a per-call or zone basis, see Table 26: LD 117 - Configure voice-quality metric thresholds on page 132.

To configure voice-quality metric thresholds in Element Manager, select: **Configuration > IP Telephony > Quality of Service**.

Table 26: LD 117 - Configure voice-quality metric thresholds

Command	Description
CHG CQWTH <WarnJitter> <WarnLatency> <WarnPacketLoss> <WarnRFactor>	
	Change voice-quality Warning thresholds on a per-call basis • <WarnJitter> = 5-(20)-200 msec • <WarnLatency> = 5-(40)-100 msec • <WarnPacketLoss> = 5-(20)-100 in units [1/10 of a percent] For example, 10 means 1% • <WarnRFactor> = 20-(65)-94 Changes to threshold values are not propagated to the Signaling Server or the Voice Gateway Media card until a data dump is performed.
CHG CQUTH <UnacpJitter> <UnacpLatency> <UnacpPacketLoss> <UnacpRFactor>	
	Change voice-quality Unacceptable thresholds on a per-call basis • <UnacpJitter> = 5-(40)-500 msec • <UnacpLatency> = 5-(100)-500 msec • <UnacpPacketLoss> = 5-(70)-250 in units [1/10 of a percent] For example, 10 means 1% • <UnacpRFactor> = 20-(60)-94 Changes to threshold values are not propagated to the Signaling Server or the Voice Gateway Media card until a data dump is performed.
CHG ZQWTH <WarnJitter> <WarnLatency> <WarnPacketLoss> <WarnRFactor>	
	Change voice-quality Warning thresholds on a zone basis • <WarnJitter> = 0-(20)-100% • <WarnLatency> = 0-(20)-100%

Command	Description
	• <WarnPacketLoss> = 0-(20)-100% • <WarnRFactor> = 0-(20)-100% Changes to threshold values are not propagated to the Signaling Server or the Voice Gateway Media card until a data dump is performed.
CHG ZQUTH <UnacpJitter> <UnacpLatency> <UnacpPacketLoss> <UnacpRFactor>	
	Change voice-quality Unacceptable thresholds on a zone basis • <UnacpJitter> = 0-(2)-100% • <UnacpLatency> = 0-(2)-100% • <UnacpPacketLoss> = 0-(2)-100% • <UnacpRFactor> = 0-(2)-100% Changes to threshold values are not propagated to the Signaling Server or the Voice Gateway Media card until a data dump is performed.

LD 117 - Print voice-quality metric thresholds

To print voice-quality metric thresholds, use the following command:

Table 27: LD 117 - Print voice-quality metric thresholds

Command	Description
PRT QSTHS	Print all voice-quality thresholds

LD 117 - Configure voice-quality sampling (polling)

To configure the sampling (polling) period, zone alarm-rate collection window, and the minimum number of samples to collect during the window, see Table 28: LD 117 - Configure voice-quality sampling (polling) on page 133.

To configure voice-quality sampling in Element Manager, select: **Configuration > IP Telephony > Quality of Service**

Table 28: LD 117 - Configure voice-quality sampling (polling)

Command	Description
CHG SQOS <SamplePeriod> <SampleRateWindow> <MinSampleCnt>	
	Change voice-quality sampling parameters

Command	Description
	• <SamplePeriod> = 5-(30)-60 • <SampleRateWindow> = 60-(300)-3600 seconds • <MinSampleCnt> = 50-(100)-1000

LD 117 - Configure zone alarm-notification levels

Systems that process a large number of calls potentially generate a significant number of SNMP alarms. Controlling the number of alarms by configuring zone alarm-notification levels assists in isolating voice-quality problems and reducing network traffic.

Voice-quality threshold alarms are examined for their severity relative to the alarm notification level settings. If the voice-quality threshold alarm severity exceeds the configured notification level, it generates an SNMP alarm. Otherwise, it is suppressed.

Voice-quality threshold alarm notification levels can be set on a zone-by-zone basis so that some bandwidth zones can be monitored for all alarms and other zones report only serious voice-quality problems. Alarm notification levels are defined in Table 29: Voice-quality threshold alarm notification levels on page 134.

Table 29: Voice-quality threshold alarm notification levels

Level	Description	Alarms
0	All voice-quality alarms are suppressed	None
1	Allow zone-based Unacceptable alarms	QOS0017 QOS0018 QOS0019 QOS0020 QOS0021
2	Allow all of the preceding PLUS zone-based Warning alarms	All of the preceding PLUS QOS0012 QOS0013 QOS0014 QOS0015 QOS0016
3	Allow all of the preceding PLUS per-call Unacceptable alarms	All of the preceding PLUS QOS0007 QOS0008 QOS0009 QOS0010 QOS0011 QOS0021 QOS0032 QOS0033 QOS0036 QOS0037
4	Allow all of the preceding PLUS per-call Warning alarms	All of the preceding PLUS QOS0001 QOS0002 QOS0003 QOS0005 QOS0006 QOS0018 QOS0019 QOS0022 QOS0023 QOS0024 QOS0025 QOS0026 QOS0027

To control the number of alarms generated by the system, use the commands in Table 30: LD 117 - Configure zone alarm-notification levels on page 135.

To configure zone alarm-notification levels in Element Manager, select: **System Status > Call Server > IP Telephony Quality of Service Diagnostic**

Table 30: LD 117 - Configure zone alarm-notification levels

Command	Description
CHG ZQNL <ZoneNumber> <level>	Change the Notification Level for the specified zone • <ZoneNumber> = 0-2550-8000 • <level> = 0-(2)-4

LD 117 - Print zone alarm-notification levels

The following LD 117 command prints zone alarm-notification levels.

Table 31: LD 117 - Print zone alarm-notification levels

Command	Description
PRT ZQNL <ZoneNumber>	Print the Notification Level for the specified zone • <ZoneNumber> = 0-2550-8000

Diagnosing and isolating voice-quality problems

Network diagnostic utilities are accessible on IP Phones to isolate voice-quality problems. Run these utilities directly from the IP Phone itself, or remotely through a CLI.

Ping and Traceroute

The administrator can execute the Ping or Traceroute command from a specific endpoint with any arbitrary destination, typically another endpoint or Signaling Server.

IP Networking statistics

The administrator can view information about the packets sent, packets received, broadcast packets received, multicast packets received, incoming packets discarded, and outgoing packets discarded.

Ethernet statistics

The administrator can view Ethernet statistics (for example, number of collisions, VLAN ID, speed and duplex) for the IP Phone on a particular endpoint. The exact statistics depend on what is available from the IP Phone for the specific endpoint.

UNISTIM/RUDP statistics

The administrator can view RUDP statistics (for example, number of messages sent, received, retries, resets, and uptime) for the IP Phones.

Real time Transport Protocol statistics

The administrator can view RTP/RTCP QoS metrics (for example, packet loss, jitter, and so on) while a call is in progress.

DHCP

The administrator can view DHCP settings (for example, IP address, S1, S2, and S4 addresses) for each IP Phone.

For detailed information about network diagnostic utilities, refer to *Avaya IP Phones Fundamentals (NN43001-368)*

Heterogeneous environments

In a heterogeneous environment, with a mixture of Avaya equipment and third-party equipment, voice-quality monitoring, detection, and alarming are performed only on IP endpoints that have voice-quality monitoring capabilities.

For information about IP endpoints and their voice-quality capabilities in the system, refer to Table 32: IP Endpoint and voice-quality capabilities on page 136.

Table 32: IP Endpoint and voice-quality capabilities

Endpoint type	Voice-quality monitoring operation
Phase 0/1 IP Phones	Detects jitter, packet loss, and latency (when the far end is RTCP-compliant) threshold violations.

Endpoint type	Voice-quality monitoring operation
	Threshold violations are detected by polling.
Phase 2 IP Phones without PVQM package	Detects jitter, packet loss, and latency (when the far end is RTCP-compliant) threshold violations. Threshold violations are detected asynchronously by the IP Phone.
Phase 2 IP Phones with PVQM package	Detects jitter, packet loss, and latency (when the far end is RTCP-compliant) and R-Value threshold violations. Threshold violations are detected asynchronously by the IP Phone.
IP Softphone 2050	Detects jitter, packet loss, and latency (when the far end is RTCP-Compliant) threshold violations. Threshold violations are detected by polling.
CS 1000and Meridian 1 systems with Voice Gateway Media Cards	Detects jitter and packet loss threshold violations. Threshold violations are detected by polling.
Third-party Gateway	Not supported

Chapter 16: pbxLink connection failure detection and status reporting enhancement

Contents

This section contains information about the following topics for Avaya Communication Server 1000 (Avaya CS 1000) and Meridian 1 systems:

Introduction

pbxLink connection failure detection and status reporting provide the following functionality:

- The pbxLink connection failure detection provides a means of detecting the link status of Signaling Servers and Voice Gateway Media Cards. An alarm is generated if the pbxLink is not detected after a warm or cold start of the Call Server.
- The STAT SERV command in LD 117 displays the link status of the Signaling Server and Voice Gateway Media Cards that were configured to connect to the system. The display also provides information about the applications running on the Signaling Server and Voice Gateway Media Cards.

pbxLink connection failure detection

The Call Server monitors the pbxLink and maintains a list of all known registered elements (Signaling Servers and Voice Gateway Media Cards). When a Call Server is booted, there is a 5-minute period to enable these known elements to re-establish contact with the Call Server.

If a known element fails to register with the Call Server, an ELAN0028 alarm is generated.

If an unknown Signaling Server or Voice Gateway Media Card registers with the Call Server, an ELAN0029 alarm is generated.

Displaying pbxLink information

Element Manager

For a CS 1000 system, use the **`pbxLinkShow`** command in Element Manager to display pbxLink information. In the Element Manager navigator, click **IP Network > Node Maintenance and Reports**.

CLI

For a Meridian 1 system, use the LD 117 STAT SERV command at the CLI of the Call Server to display the pbxLink information.

LD 117 STAT SERV

The suite of STAT SERV (Stat Services) commands enables a technician to display link status information for elements that are registered to a Call Server.

STAT SERV can provide consolidated link status information by application type, IP address, host name, and IP Telephony node ID.

STAT SERV status information includes the following:

- node ID
- host name
- IP address
- element role
- platform type
- enabled applications
- registered/unregistered endpoints, such as IP Phones and Voice Gateway Media Cards
- pbxLink
    - the time the pbxLink was last established
    - the time the pbxLink was lost, if previously established

- the time the pbxLink last attempted to establish a connection, if the pbxLink failed to establish

- enabled applications

Application information

If an active link to an element is established, the Call Server obtains information about the applications running on the element.

Table 33: Queried information in STAT SERV on page 141 lists the applications and describes the information obtained about those applications.

Table 33: Queried information in STAT SERV

Application/element	Information provided
LTPS application	number of registered IP Phone number of busy IP Phones
VTRK application	number of registered VTRKs number of busy VTRKs
Voice Gateway Media Cards	number of registered Voice Gateway Media Cards number of busy Voice Gateway Media Cards
Signaling Servers and Voice Gateway Media Cards	time that the element established its link with the Call Server elements that failed to register or lost their link

The following example illustrates LD 117 STAT SERV output.

Commands		
STAT SERV	IP	xx.xx.xx.xx xx.xx.xx xx.xx xx
	TYPE	SRV
	APP	APPS
	NAME	HOSTNAME
	NODE	NODE_ID

Response

```
NODE HOSTNAME      ELANIP          LDR   SRV    APPS   PBXLINK   PBXLINK     PBXLINK    CONNECTID
ID                                                     STATE     DATE        TIME
909  vxTarget      47.11.216.126   YES   SMC    LTPS   LINK UP   5/06/2003   22:51:06   0x200a2128

     sets: [reg - 0002] [busy - 0000]     vgws: [reg - 0020] [busy - 0002]

999  IPService     47.11.216.141   N/A   SS     LTPS   LINK UP   5/06/2003    22:51:06   0x200a2128
                                                VTRK

     Sets: [reg - 0302] [busy - 0056]
     VTRK: [reg - 0050] [busy - 0015]

999  IPService     47.11.216.141   YES   SS     LTPS   LINK UP   5/06/2003    22:51:06   0x200a2128
                                                VTRK

     Sets: [reg - 0302] [busy - 0056]      VTRK: [reg - 0050] [busy - 0015]

999  vxTarget      47.11.216.143   NO    ITGP   LTPS   INV CONN     5/06/2003    23:18:08   0x0

999  vxTarget      47.11.216.144   NO    ITGP   LTPS   FAILED    5/06/2003    22:51:06   0x0
```

Figure 9: Sample LD 117 STAT SERV output

Table 34: STAT SERV response fields and description on page 142 lists the descriptions for the fields in the STAT SERV response.

Table 34: STAT SERV response fields and description

STAT SERV response field	Description
NODE ID	Identifies the related node. Value is a number from 0 – 9999.
HOSTNAME	Identifies the alias that the host is given by the system. Value is a string.
ELANIP	Identifies the element's (ELAN network interface) IP connection to the Call Server. Value is an IP address.
LDR	Specifies if the element is the Leader for the related node. Value is YES or NO.
SRV	Specifies the element type. Values are:

STAT SERV response field	Description
	• SMC – Media Card 32-port card • ITGP – ITG-P 24-port card • SS – Signaling Server
APPS	Specifies the application running on the element. Values are: • LTPS • VTRK
PBXLINK STATE	Specifies the element's current pbxLink state. Values are: • LINK UP • LOST • FAILED • INV CONN (element is connected, but its configuration was not found on the Call Server, indicating that this element might be connected to the wrong Call Server)
PBXLINK DATE/TIME	Specifies when the element's pbxLink state last changed.
CONNECTED	Specifies the element's connection ID.
sets	Values are: • reg – the number of IP Phones registered to the element • busy – the number of IP Phones that are currently busy
vgws	Values are: • reg – how many voice gateways (DSP resources) are configured on the element • busy – how many voice gateways (DSP resources) are active/busy on the element
VTRK	Values are: • reg – how many VTRK channels are configured on the element • busy – how many VTRK channels are active/busy on the element

Chapter 17: Final maintenance procedure

Introduction

Perform the final maintenance procedure to verify that the system is operating properly and that there are no remaining faults.

Final maintenance procedure

1. Ensure all cards that were removed are reinserted in their assigned locations and enabled.
2. Ensure all wiring and connectors that are disconnected are reconnected.
3. Ensure all loops and shelves that should be enabled are enabled.

   Note:

   Digital telephones on a network loop that was disabled may not be restored when the loop is enabled. Each telephone should be individually disabled and reenabled through LD 32. Service may also be restored by disconnecting and reconnecting the telephone line cord.

4. Make sure all circuit breakers are set to ON and any fuses (in power panels or auxiliary equipment) are inserted.
5. Clear fault indicators by entering:

   `LD 35 or LD 135`

   To clear the maintenance display in a single CPU system, enter:

   `CDSP`

   To clear the maintenance display in a dual CPU system, clear the display on one CPU by entering:

   `CDSP`

   Test the CPU by entering:

   `TCPU` (LD 35), or

   `TEST CPU` (LD 135)

   If the response is "OK," switch CPUs by entering:

   `SCPU`

Clear the display on the other CPU by entering:

`CDSP`

To clear a major alarm indication and restore Power Fail Transfer Units (PFTUs) to normal operation, enter:

`CMAJ`

To clear a minor alarm indication from all attendant consoles, enter:

`CMIN ALL`

6. Set the midnight routine to run after you log out of the system with:

   `MIDN`

   End the session in LD 35 or LD 135 and log out of the system:

   ****

   `LOGO` (The midnight routine runs now.)

7. Check system messages produced when the midnight routine runs. Clear any faults indicated.
8. If there was a sysload (reload) while you were clearing a fault, reset the correct time and date by entering:

   `LD 2 STAD` (day) (month) (year) (hour) (minute) (second)

   Check the time and date you entered:

   `TTAD`

   End the session in LD 2 and log out of the system:

   ****

   `LOGO`

9. Replace any covers you removed from modules.
10. Tag defective equipment with a description of the fault and return it to a repair center.

Chapter 18: Software maintenance tools

Contents

This section contains information about the following topics for Avaya Communication Server 1000 (Avaya CS 1000) and Meridian 1 systems:

Diagnostic programs

Diagnostic software programs monitor system operations, detect faults, and clear faults. Some programs run continuously; some are scheduled.

Diagnostic programs are resident or non-resident. Resident programs, such as the Error Monitor and Resident Trunk Diagnostic, are always present in system memory. Non-resident programs, such as the Input/Output Diagnostic and Common Equipment Diagnostic, are used as Midnight and Background Routines or for interactive diagnostics. Non-resident programs are loaded from the system disk and are run as scheduled or upon request.

Non-resident programs are called overlay programs or loads. They are identified by a title and a number preceded by the mnemonic for load (for example, Trunk Diagnostic – LD 36).

See *Avaya Software Input Output Maintenance (NN43001-711)* for detailed information about all diagnostic programs.

Error Monitor

The Error Monitor is a resident program that continuously tracks call processing. The Error Monitor generates system messages if it detects invalid or incorrectly formatted call-processing information.

System messages generated by the Error Monitor are preceded by the mnemonic ERR, which usually indicates hardware faults, or the mnemonic BUG, which usually indicates software problems. With prompt ERRM in the Configuration Record (LD 17), you can instruct the system to print or not print ERR or BUG messages.

Refer to *Avaya Software Input Output Reference – System Messages (NN43001-712)* for help in interpreting system messages, including ERR and BUG.

Health Check Tool

A new Health Check (HC) tool is introduced to provide status information, including a health rating score for different elements of the CS 1000 system. This information can be used to guide service personnel to the areas of the system that require maintenance or further diagnostics. Health Check is a PC based GUI application available for download from the Avaya Support portal. It is configured by the user to identify the functionality and network address of the components to be monitored.

Once configured, Health Check connects to CS 1000 components including the Call Server, Signaling Server, Media Gateway Controller and Media Cards, via an SSH port through the ELAN connection of each component. Upon connection and based on the functionality of the component, the application issues a set of commands and status requests, and records the results. A predefined set of commands is used so the information gathered is interpreted and handled in a controlled way.

When the testing of each component is complete, an html report providing an executive level summary of the components is generated and can be viewed from the PC browser.

For more information on the Health Check tool, see *NN43001–408, Upgrades Guide*.

Initialize Program

The Initialize Program momentarily interrupts call processing as it clears common equipment faults. It then rebuilds call-dependent data and generates system messages, with the mnemonic INI, that indicate the status of the system. This process is called an initialization.

Through an initialization, firmware can be downloaded from the CPU to superloop network cards and controller cards. Call processing is interrupted for an additional amount of time during this process.

An initialization can be activated by pressing the manual initialize (Man Int) button on the following:

- NT6D66 Call Processor Card

An initialization always occurs automatically after the System Loader program runs. An initialization often occurs when a software or firmware fault is detected and when a common equipment hardware fault is detected.

Midnight and Background Routines

In the Configuration Record (LD 17), select the overlay programs for the Midnight Routine and Background Routine. These routines automatically perform maintenance checks. Programs included in the Midnight Routine are defined with the prompt DROL (derived from "daily routine overlay"). Programs included in the Background Routine are defined with the prompt BKGD.

The Midnight Routine runs once every 24 hours. This routine is preset to run at midnight when a system is shipped, but you may assign a different time in the Configuration Record. When it is time for the Midnight Routine to start, the system cancels any other program.

The Background Routine runs when no other program is loaded in the overlay area. The programs included in the Background Routine run in sequence repeatedly until the Midnight Routine runs or there is another request to use the overlay area (for example, if logging on to check the status of a circuit card).

The programs listed in Table 35: Programs used in Midnight and Background Routines on page 149 can be included in Midnight and Background Routines. Maintenance requirements and the configuration of the system determine the programs included in Midnight and Background Routines.

Note:

Software Audit (LD 44) should always be used in the Background Routine.

Table 35: Programs used in Midnight and Background Routines

Program number	Program function
LD 30	Network and Signaling Diagnostic
LD 32 (Midnight only)	Network and Peripheral Equipment Replacement
LD 33	1.5 Mbyte Remote Peripheral Equipment Diagnostic
LD 34	Tone and Digit Switch and Digitone Receiver
LD 36	Trunk Diagnostic 1
LD 38	Conference Circuit Diagnostic
LD 40	Call Detail Recording Diagnostic
LD 41	Trunk Diagnostic 2
LD 43 (Midnight only)	Data Dump (see Note 2)
LD 44	Software Audit
LD 45	Background Signal and Switching Diagnostic
LD 46	Multi frequency Sender Diagnostic for ANI
LD 60 (Midnight only)	Digital Trunk Interface Diagnostic

Program number	Program function
LD 61 (Midnight only)	Message Waiting Lamps Reset
Note: LD 43 is automatically activated during midnight routines if changes occurred within the past 24 hours.	

Overlay Loader

This resident program locates, loads, and checks all overlay programs. It automatically activates the Midnight and Background Routines. Load programs manually by entering commands through the system terminal or maintenance telephone. Once the program is loaded, the program mnemonic (such as TRK for Trunk Diagnostic) is seen on the system terminal.

The Overlay Loader can also be used to enable, disable, and display the status of the disk drive unit.

Overload Monitor

The system continuously monitors the volume of system messages. If it detects too many error messages from a line or trunk card, the system activates the Overload Monitor program. The Overload Monitor disables the faulty card and generates system messages with the mnemonic OVD.

Refer to *Avaya Software Input Output Reference – System Messages (NN43001-712)* for help in interpreting system messages.

Resident Trunk Diagnostic

This program automatically monitors all trunk calls and records apparent faults on each trunk. If the number of faults on a trunk exceeds the threshold for that trunk, the program generates a system message identifying the trunk and the type of fault.

A failure on a trunk may keep the trunk from detecting incoming calls. The threshold mechanism cannot detect such a failure, so this program also records how many days it is since each trunk received an incoming call. If it is suspected some incoming calls are not being processed, use the command LMAX in Trunk Diagnostic 1 (LD 36) to identify the trunk with the maximum idle days.

System Loader

The System Loader program loads all call-processing programs and data and starts memory-checking diagnostics. After all required programs and data are loaded and all checks performed, the System Loader is erased from system memory, the Initialize Program runs, and normal call processing begins. This process is called a sysload or system reload.

The System Loader operates automatically on system power up or if a common equipment or power fault destroys information in the system memory. For maintenance purposes, this program is generally activated only if call processing is stopped.

Start a sysload manually by pressing the reload (Rld) button on the following:

- NT6D66 Call Processor Card (simultaneously press both buttons)

Caution:

During a sysload active calls are not disconnected and the system goes into an emergency line transfer state. Activate the System Loader only if specifically instructed to do so by Avaya.

To minimize sysload time, enable the Short Memory Test capability in LD 17 (prompt SMEM). If the test is enabled, only one pass of memory testing is performed on a normal reload. If any subsequent system failure causes an automatic reload, the full six-pass Memory Test is performed on all system memory.

System features

When the system receives a system reload signal, the sysload occurs in two to five minutes, depending on the size of the customer database. During the sysload, the system performs a core shelf test, which includes self-tests on the CP and the IOP part of the IOP/CMDU. The results of the self-tests are displayed on the liquid crystal display (LCD) on the CP card, the hex display on the IODU/C card, and the system terminal. On the other core cards, the LED blinks three times after a successful test.

The system typically performs an initialization in under 90 seconds. Only the active core side can be manually initialized.

The overlays reside in dynamic random access memory (DRAM) after they are loaded from the hard disk during an initial software load (software is shipped on redundant hard disks). Because of they are always in resident memory, the overlays can be loaded quickly.

The system can diagnose faults in field replaceable units for all core hardware, including cables. In case of a failure, a message in a natural language (such as English) appears on the system terminal and on the Liquid Crystal Display (LCD) on the CP card.

If there is a hardware fault, the system attempts a recovery. In the case of a redundant hardware failure, under certain conditions the system attempts a graceful switchover to the core side without the failure.

Remote operation capabilities include remote access to both Core Modules or Core/Network Modules; the ability to sysload, initialize, or put the system in a split mode; and the ability to upload and download the customer database. Access the core complex in each Core Module or Core/Network Module through the I/O ports on the CP cards.

Interactive diagnostics

Overlay programs, including programs called maintenance routines, can be loaded into memory through the system terminal or maintenance telephone. This function is performed by the Overload Loader program.

Note:

The programs used in Midnight and Background Routines are also used manually as interactive diagnostic programs (see Table 35: Programs used in Midnight and Background Routines on page 149).

Maintenance routines are used interactively with a command/response format. In this format, enter a command that tells the system to perform a specific task. The system performs the task and sends system messages indicating the status or errors.

Interactive diagnostics enable the following:

- disable, test, and enable specific equipment
- verify that a reported fault still needs to be cleared
- verify that a repair procedure clears a fault

All maintenance programs and commands are described in detail in *Avaya Software Input Output Maintenance (NN43001-711)*. For help with interpreting system messages, refer to *Avaya Software Input Output Reference – System Messages (NN43001-712)*.

Manual continuity tests

Manual continuity tests can be performed on superloop network cards, intelligent peripheral equipment, and Basic Rate Interface (BRI) equipment. A continuity test generates a signaling pattern at one point, monitors its progress, and checks for its detection at an end point. For example, when a superloop network card sends a signal to a controller card, the continuity test verifies the following:

- the superloop network card sent the signal
- the loop carried the signal to the controller card
- the controller card received the signal

In a point-to-point continuity test, a superloop network card or a controller card can generate or detect the test pattern. In loopback tests, one card, a superloop network card, a controller card, or a multipurpose ISDN signaling processor (MISP) card, is both the generator and the detector. Only idle timeslots are tested in any of the continuity tests.

There are two types of loopback tests for BRI equipment. In one type of test, the pattern generated by the MISP card loops back through the digital subscriber loop (DSL) interface. In the other type of test, the pattern generated by the MISP card loops back through an S/T-interface line card (SILC) or a U-interface line card (UILC), depending on which is specified. Both types of test are accessed as Test 9, but responses to the series of prompts for Test 9 determine the loopback point.

Fifteen continuity tests can run simultaneously. When a test is completed, it stops, the status is reported, and the other tests continue running. The status of any test can be checked at any time. When all the tests end, the number of tests run and any failed tests are reported to the CPU. The results can be displayed at any time during the procedure.

There are nine continuity test configurations. Run each test by entering a set of prompts outlined in the Background Signaling and Switching Diagnostic (LD 45). Figure 10: Manual continuity tests: point-to-point configurations on page 154 shows point-to-point configurations. Figure 11: Manual continuity tests: loopback configurations on page 155 shows loopback configurations.

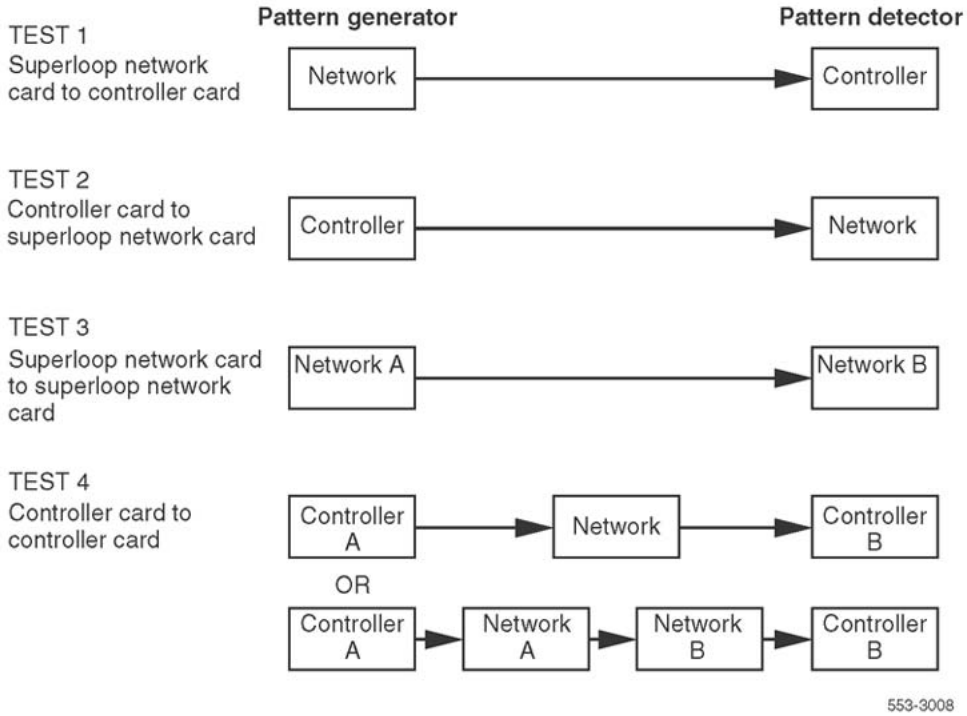

Figure 10: Manual continuity tests: point-to-point configurations

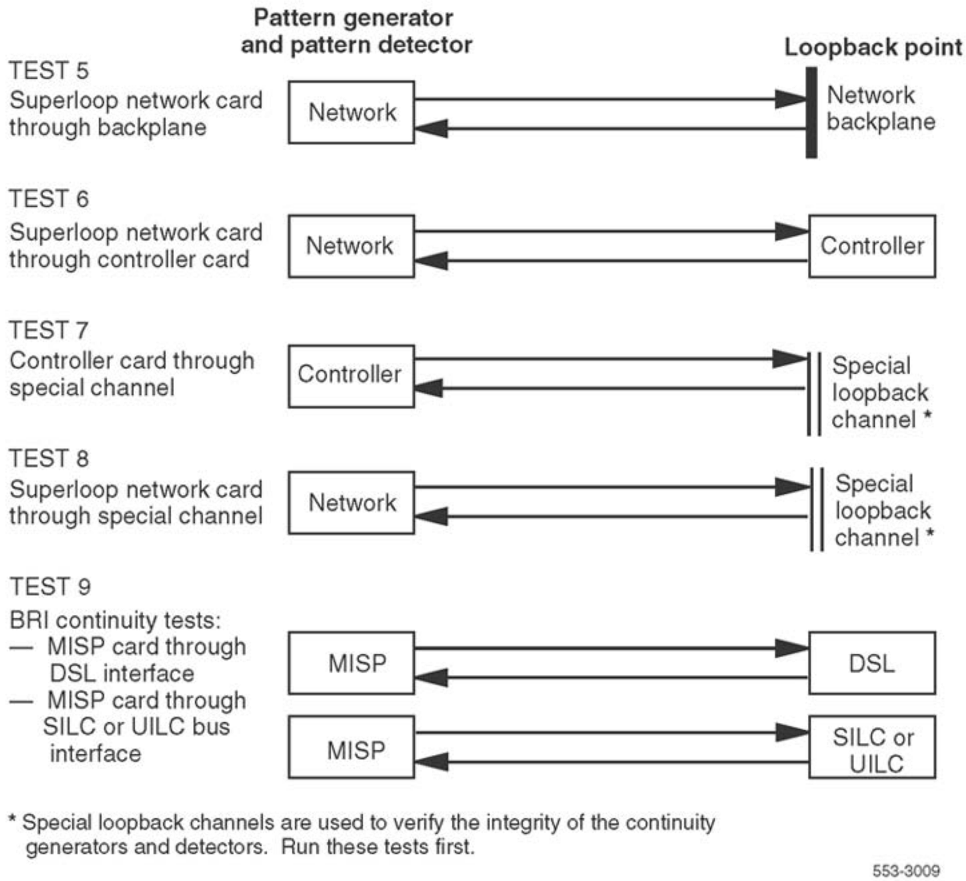

Figure 11: Manual continuity tests: loopback configurations

CS 1000 Software Logs

The CS 1000 logging infrastructure is a collection of log files that are created and archived across multiple elements to develop a CS 1000 solution. The logs provide various information related to specific events that occur during different operational states of the CS 1000 solution. The collected informations in the logs include information related to the status of software and hardware, user administrative activity, security events, operational messages, and software debug messages.

The collected informations have many uses and can apply to many aspects of system management. The users of this log information are network operations, security administrators, software developers, network engineering, and customer support.

For more information, see Logging section of *Avaya System Management Reference, NN43001-600*.

Chapter 19: Hardware replacement guidelines

Contents

This section contains information about the following topics:

Precautions

To avoid personal injury and equipment damage, review the following guidelines before handling equipment.

Power equipment

There are no user-repairable components in the power system. If a power supply fails, the complete unit must be replaced. Do not disassemble a power supply under any circumstances.

Voltage:

DANGER OF ELECTRIC SHOCK

To avoid the danger of electric shock, be very careful when working with power equipment and connections. Warning notices on the equipment are displayed and must be heeded.

Circuit cards

Handle cards as follows:

- Unpack or handle cards away from electric motors, transformers, or similar machinery.
- Handle cards by the edges only. Do not touch the contacts or components.
- Set cards on a protective antistatic bag. If an antistatic bag is not available, hand hold the card, or set it in a card cage unseated from the connectors.
- Store cards in protective packing. Do not stack cards on top of each other unless they are packaged.

To avoid card damage from static discharge, wear a properly connected antistatic wrist strap when working on equipment. If a wrist strap is not available, regularly touch one of the bare metal strips in a module to discharge static. Figure 12: Static discharge points on page 159 shows the recommended connection points for the wrist strap and the bare metal strips that should be touched.

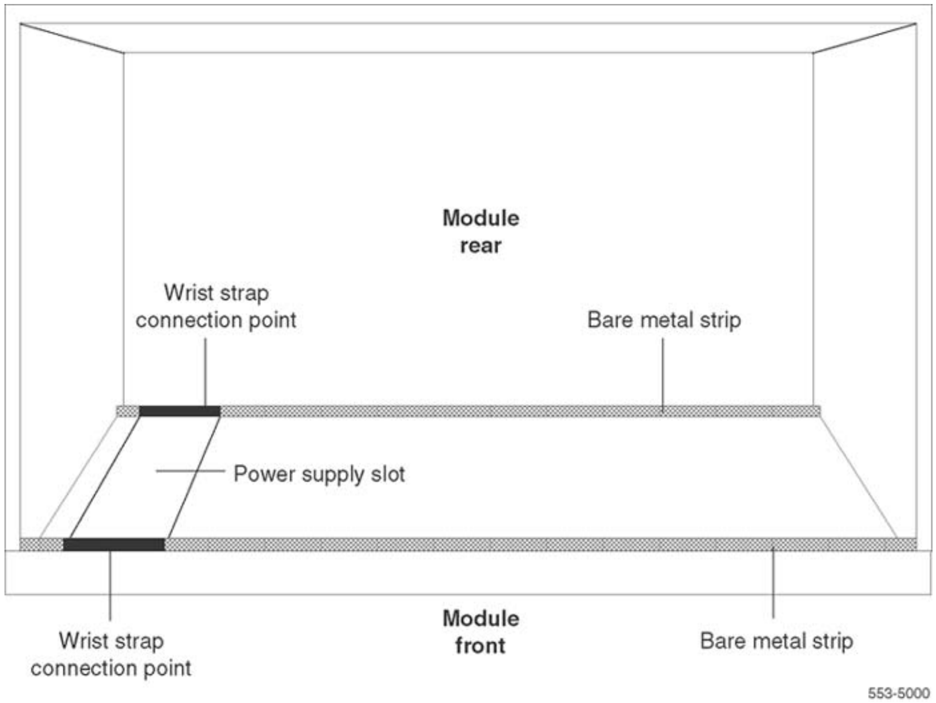

Figure 12: Static discharge points

During replacement procedures:

- Turn off the circuit breaker or switch for a module power supply before the power supply is removed or inserted.
- In AC-powered systems, capacitors in the power supply must discharge. Wait five full minutes between turning off the circuit breaker and removing the power supply from the module.
- Software-disable cards, if applicable, before they are removed or inserted.
- Hardware-disable cards, whenever there is an enable/disable switch, before they are removed or inserted.
- Return defective or heavily contaminated cards to a repair center. Do not try to repair or clean them.

Data disks

Follow the precautions below to avoid damaging disks:

- Handle only the hard surface; never touch the recording surface.
- Keep disks away from strong magnetic fields.
- Avoid exposing disks to extreme heat, rapid changes in temperature, or high humidity.
- Store disks in a suitable container.

To install a disk, make sure the arrow on the label is pointing up and the rounded corner is on the bottom on the right-hand side.

⚠ **Caution:**

Damage to Equipment

The disk drive can be damaged if an upside-down disk is forced into the slot. If there is significant resistance when trying to insert a disk, remove the disk and check the position.

System cable guidelines

To disconnect a cable from the Core/Network Module backplane, use the P0741489 Extraction Tool provided in the rear of the module (behind the I/O safety panel).

⚠ **Caution:**

Damage to Equipment

Use the P0741489 Extraction Tool to disconnect cables from the backplane shrouds in the NT5D21 Core/Network Module.

Follow the procedure below to avoid bending or breaking pins when removing cable connectors from the backplane shrouds. Do not insert the extraction tool unless the cable connector is locked into the shroud. Do not force the extraction tool deeper than the detent on the cable connector.

1. Grasp the cable connector by the strain relief tab.
2. Center the longer flat edge on the angled end of the tool between the cable connector and the wall of the shroud on the right side of the cable connector.

   Note:

   If the straight end of the tool is notched, use that end if the connector can be accessed straight-on. If you must angle the tool at all, use the angled end.
3. Gently insert the extraction tool and gradually apply pressure while gently rocking the cable connector up and down.
4. Stop applying pressure as soon as the detent of the cable connector comes loose from the shroud.
5. Slowly remove the extraction tool and the cable connector.

Before connecting cables to the backplane, visually inspect the backplane shroud connectors to make sure there are no bent pins. To connect cables:

1. Orient the cable connector so the strain relief paddle is to the right.
2. Partially insert the cable connector so its guides mate to the corresponding backplane connector.
3. Apply a small amount of pressure to push the cable connector straight into the backplane connector. You feel a detent click when the connector seats.

Caution:

Damage to Equipment

Pins may be bent or broken if attempting to insert the cable connector at an angle. Do not push the connector in any further after hearing the detent click.

Chapter 20: Hardware maintenance tools

Contents

This section contains information about the following topics for Avaya Communication Server 1000 (Avaya CS 1000) and Meridian 1 systems:

Overview

There are fault indicators and hardware features that help perform maintenance tasks (particularly identifying and clearing faults). These maintenance tools include the following:

- circuit card features that include card level tests and status indicators
- CPU controls that allow control of common equipment functions
- system alarms that categorize the severity of a system failure
- system monitor indicators that identify power and temperature faults

Circuit card features

Card test

A card test checks to see that a card is working correctly. Many cards perform a self-test on power-up. Card-level tests can also be forced through software commands.

When intelligent peripheral cards or network cards are installed, the red LED on the faceplate remains lit for two to five seconds while a self-test runs. (The time required for the self-test depends on the type of card.) If the test is successful, the LED flashes three times and remains lit until the card software is configured and enabled, and then the LED goes out. If the LED does not follow the pattern described or operates in any other manner (such as continually flashing or remaining weakly lit), the card should be replaced.

When Core common control cards are installed, a self-test runs. If the self-test is successful, the LED flashes three times and goes out

Enable/disable switch

Some cards a switch on the faceplate that enables or disables the hardware for that card.

If possible, when removing a card, disable the software; then, disable the hardware by setting the switch to DIS.

Hardware-disable a card (set the switch to DIS) before installing it. After the card is locked into position, set the switch to ENB. Then enable the card in software. Disable and enable cards as described in the *Avaya Software Input Output Administration (NN43001-611)*.

Figure 13: Sample enable/disable switch on page 165 shows the typical location of an Enable/Disable (ENB/DIS) switch.

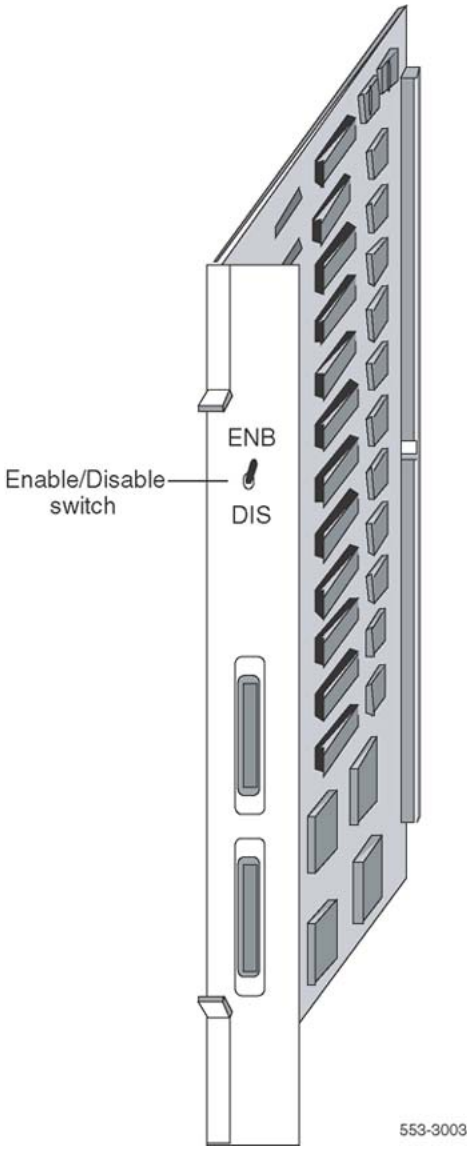

Figure 13: Sample enable/disable switch

LED

Many cards one or more LEDs on the faceplate. The LED gives a visual indication of the status of the card or of a unit on a card.

The shape of the LED does not indicate function.

When a green LED is steadily lit, it indicates the card is operating normally. When a green LED is off, it indicates the card is disabled or faulty.

When a red LED is steadily lit, it indicates the card, or a unit on it, is disabled or faulty or unequipped. When a red LED is off and power is available to the card, it indicates the card is operating normally. The Core to Network Interface (CNI) Card is an exception to this rule. The red LED on the NT6D65 card is lit when the associated Core is inactive. This is normal operation.

Table 36: Sample LED indications on page 166 gives two examples of LED indications.

Table 36: Sample LED indications

Type of card	LED color	Status		
Common equipment power supply	green	LED lit	=	operation normal
Digital line card	red	LED lit	=	disabled or not equipped

Figure 14: Sample LED indicator on page 167 shows the location of the LED on the faceplate of an Intelligent Peripheral line card.

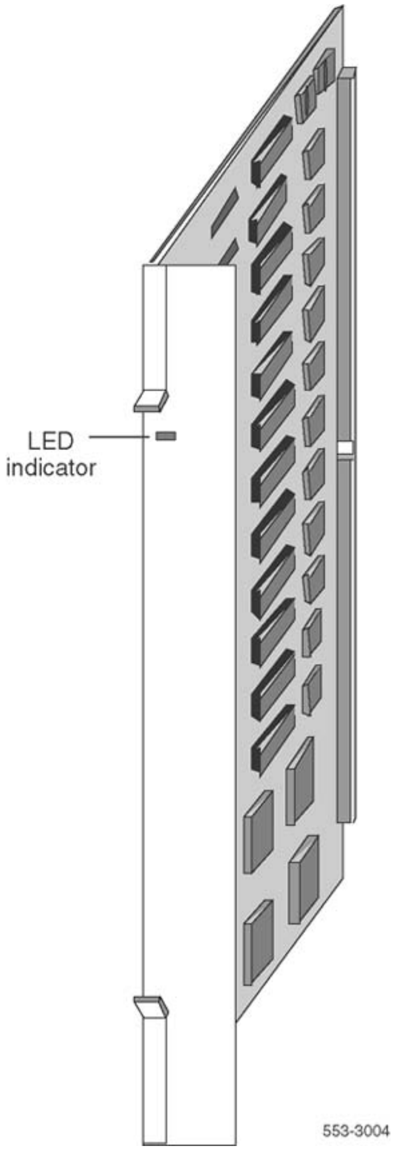

Figure 14: Sample LED indicator

Maintenance display code

Maintenance displays are located on the faceplate of some circuit cards. A hexadecimal or binary code is displayed. Interpretations of the maintenance display codes are listed in *Avaya Software Input Output Reference – System Messages (NN43001-712)*. Examine previous codes, system messages, and visual indicators with any current maintenance display codes to properly analyze faults.

The maintenance display on the Call Processor Card (NT6D66) shows two lines of information with up to 16 characters per line. The hexadecimal or binary code and its definition are shown on the display.

Each new code shown on a maintenance display overwrites the one before it. However, note the following:

- All codes received on common equipment displays are recorded. Review them by printing the History File.
- The most recent 16 codes displayed on a controller card stay in memory. Review them and reset the counter through the Network and Signaling Diagnostic (LD 30).
- The most recent 64 displays on a CP card stay in memory. Review the displays on the active CP card through the Core Common Equipment Diagnostic (LD 135).

Table 37: Circuit cards with maintenance displays on page 168 lists the cards with maintenance displays and the type of information the codes indicate on each card. Figure 15: Sample hex maintenance display on page 169 shows the location of the maintenance display on the faceplate of a floppy disk interface card.

Figure 16: Sample binary LED maintenance display on page 170 shows the location of the maintenance display on the faceplate of an NT8D01 XPEC card.

Table 37: Circuit cards with maintenance displays

Circuit card	Display indication (for all related cards)
NT6D66 Call Processor Card	During normal operation, display shows self-test codes and port number on which Controller Clock is tracking
NT5D61 IODU/C Card	
NT8D01 Controller Card NT1P62 Fiber Controller	
NT7R52 Remote Carrier Interface Card	

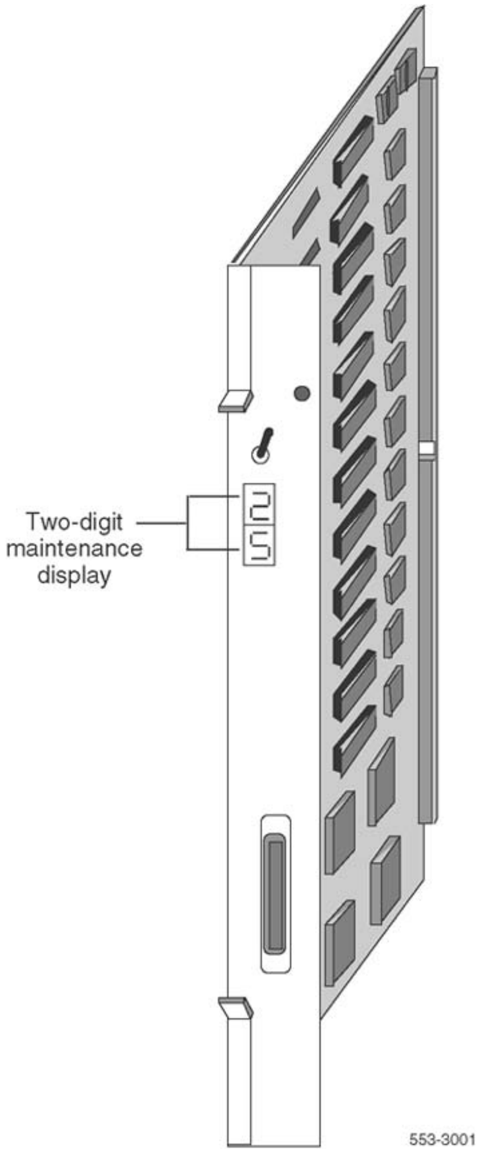

Figure 15: Sample hex maintenance display

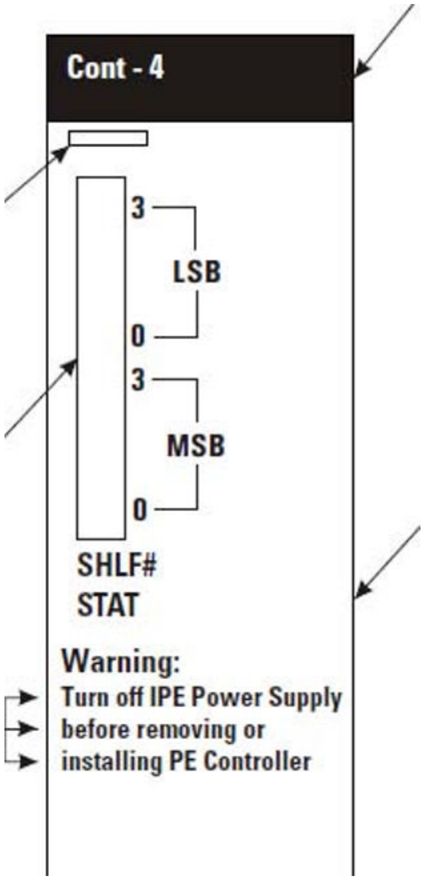

Figure 16: Sample binary LED maintenance display

Signaling Server

The Signaling Server provides a central processor to drive Session Initiation Protocol (SIP) and H.323 signaling, IP Phone signaling, and IP Peer Networking on CS 1000 systems.

The Signaling Server runs the following software on a VxWorks™ real-time operating system:

- IP Phone TPS (Terminal Proxy Server)
- SIP and H.323 signaling gateway (Virtual Trunk)
- Network Routing Service (NRS)
- CS 1000 Element Manager web server
- Application Server for the Personal Directory, Callers List, and Redial List features

The Signaling Server has both an ELAN and a TLAN interface and communicates with the Call Server through the ELAN.

Signaling Server hardware

CS 1000 Release 5.0 introduced three hardware platforms for the Signaling Server:

- CP-PM (Call Processor Pentium Mobile)
- IBM X306m
- HP DL320-G4

These hardware platforms offer greater processing power and more RAM and storage capacity than the ISP1100. The ISP1100 can still be used to run CS 1000 Release 5.5 software, but must at least 1 GB of RAM configured.

For more detail about Signaling Server maintenance, see *Avaya Signaling Server IP Line Applications Fundamentals, NN43001-125*.

CPU controls

Switches and buttons on common equipment cards are used to control CPU activity and clear common equipment faults.

Initialize button

Pressing the manual initialize (Man Int) button associated with the active CPU starts the Initialize Program. The Initialize Program clears common equipment faults, rebuilds call-dependent data, and generates system messages indicating the status of the system. This process is called an initialization. Call processing is briefly interrupted during an initialization.

Manual initialize buttons are located on the following cards:

- The initialize button is on the NT6D66 Call Processor Card.

Normal/maintenance switch

There is a normal/maintenance (Norm/Maint) switch on the Call Processor Card. Figure 17: Norm/Maint switch on the Call Processor Card on page 172 shows the location of the switch on the Call Processor Card. In dual CPU systems, use this switch as follows to keep the dual

CPUs from switching, or trying to switch, when testing or replacing common equipment hardware on the inactive CPU:

- On the CPU that is not being tested or replaced, set the switch to Maint. This CPU is active.
- On the CPU that is being tested or replaced, set the switch to Norm. This CPU remains inactive as long as the other CPU is set to Maint.

For regular operation in dual CPU systems, set both normal/maintenance switches to Norm.

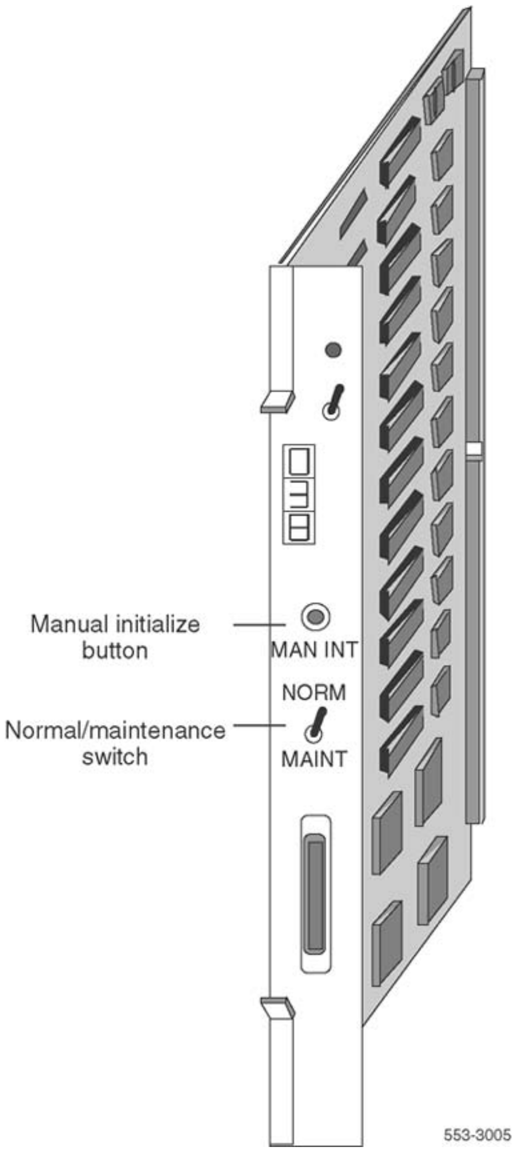

Figure 17: Norm/Maint switch on the Call Processor Card

Reload button

Reload (Rld or Man Rst) buttons are used to manually activate the System Loader program. The System Loader initiates call processing and starts memory-checking diagnostics. This process is called a sysload or system reload. The reload button (Man Rst) is on the Call Processor Card.

To start a sysload, press both reload buttons simultaneously.

Figure 18: Reload button on the changeover and memory arbitrator card on page 174 shows the location of the reload button on a QPC581 CMA Card.

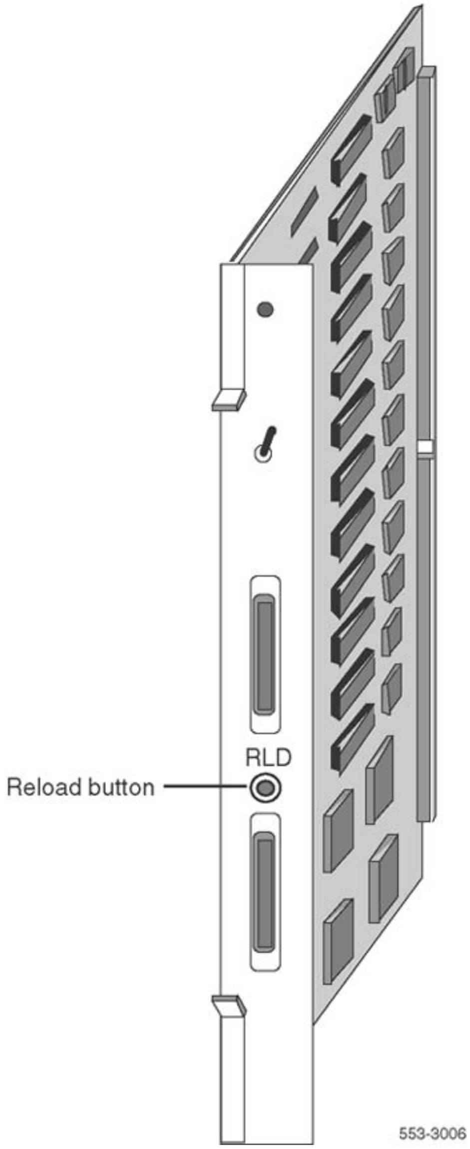

Figure 18: Reload button on the changeover and memory arbitrator card

Caution:

During a sysload active calls are disconnected and the system goes into an emergency line transfer state. Use the reload button only if specifically instructed to do so by Avaya.

System alarms

System alarms are based on various fault monitors and indicators. The category of the alarm – major, minor, or remote – indicates the severity of the system failure.

- A major alarm requires immediate action by the technician.
- A minor alarm requires attention, but not necessarily immediate attention, by the technician.
- A remote alarm may require attention by the technician.

Major alarms

A major alarm indicates a fault that seriously interferes with call processing. The following faults cause a major alarm:

- CPU or control bus failure
- disk system failure when attempting to load the system
- system power failure (without reserve power)
- temperature fault (excessive heat)

When there is a major alarm, the red LED at the top of the affected column lights. A major alarm also activates a display on all attendant consoles.

When a system is equipped with a power failure transfer unit, a major alarm causes designated analog (500/2500-type) telephones to connect directly to Central Office trunks; this is called a line transfer.

Minor alarms

A minor alarm indicates the system hardware or software has detected a fault requiring attention. The following faults cause a minor alarm:

- Automatic identification of outward dial (AIOD) trunk failure
- conference failure
- digitone receiver failure
- memory failure
- more than one fault on different line and trunk cards in one shelf (indicated on affected customer's console only)
- network failure (indicated on affected customer's console only)

- peripheral signaling failure
- serial data interface failure
- tone and digit switch failure

A minor alarm displays an alarm on attendant consoles in customer groups affected by the fault. (A minor alarm indication on the console is an optional feature, enabled and disabled on a customer basis through data administration procedures.)

Remote alarms

A remote alarm is an optional extension of a major alarm to another location, such as a monitoring or test center, or to an indicator, such as a light or bell. When a major alarm occurs, the system provides relay contact closure across two remote alarm lines, REMALMA and REMALMB. These lines are extended to the main distribution frame (MDF) through the system monitor to MDF cable for customer use. The relay contacts are rated at 30 V DC and 2 amps. The REMALMB line is the return or ground for the REMALMA line. Avaya does not extend remote alarm lines beyond the MDF.

System monitor indicators

The system monitor checks the column temperature, cooling system status, and system voltage status and controls line transfer states accordingly.

NT8D22 System Monitor

The system is equipped with the NT8D22 System Monitor, which is installed in the rear of the pedestal in each column. Table 38: Faults monitored by the NT8D22 System Monitor on page 176 lists faults monitored by this system monitor.

In multiple-column systems, there is one master system monitor, located in the column with CPU 0, and multiple slave system monitors. A switch setting on each system monitor defines the master or the address of each slave.

Table 38: Faults monitored by the NT8D22 System Monitor

Power faults	Source
CPU condition	CPU failure Sysload (system reload)
Main power loss	System input power, AC or DC
Power supply failure	Common equipment power supply

Power faults	Source
	Common/peripheral equipment power supply Peripheral equipment power supply Ringing generator
Temperature alarm	Blower unit Column temperature sensors

The master system monitor checks the CPU column and periodically polls the slaves to check their status. When polled, the slaves report their status to the master. If a slave does not respond when it is polled, the master reports the address as a faulty slave.

If a slave is removed, the master cannot communicate with higher addresses. Therefore, the master considers the removed slave and all slaves with a higher address as disabled. For example, if slave 2 is disabled, the master also reports slaves 3, 4, and up as disabled.

The system monitor reports power equipment status and faults to the CPU. (Only the master system monitor communicates with the CPU.) System messages generated by the system monitor are identified by the mnemonic PWR. Figure 19: NT8D22 System Monitor message flow on page 177 shows the flow of messages from NT8D22 System Monitors to the system terminal.

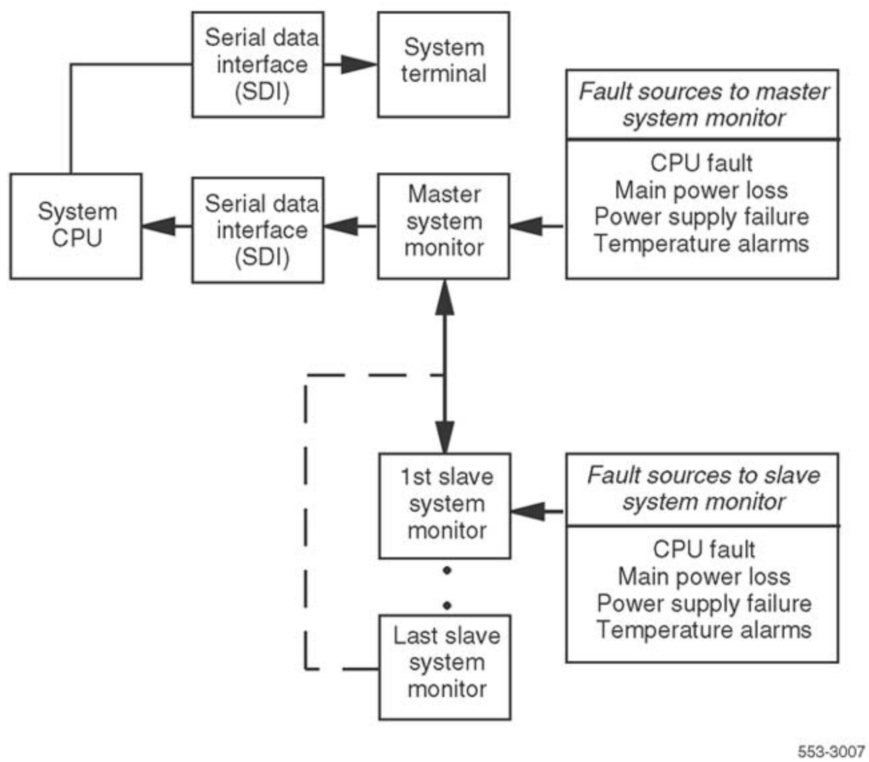

Figure 19: NT8D22 System Monitor message flow

If there is a fault, the system monitor lights the LED on the affected column.

Line transfer

Optionally, connect one or more power failure transfer units (PFTUs) to the system. Each PFTU connects up to eight designated analog (500/2500-type) telephones to Central Office trunks. If call processing stops, those analog (500/2500-type) telephones are transferred through the PFTU to the Central Office so that outside connections are still available. A line transfer occurs during the following situations:

- during a sysload (system reload)
- if there is a major power failure in a DC-powered system (as detected by the TRIP signal)
- if call processing stops because of a CPU failure
- if there is a loss of power to the column
- if there is a loss of power to the PFTU
- if the temperature in a column is too high
- if a line transfer button on the attendant console is pressed (this applies on a customer basis)
- if a line transfer switch on the PFTU is turned on

Note:

If position 4 on Switch 1 (SW1) is set to OFF on a system monitor, that system monitor's column does not activate a line transfer when the temperature is too high.

Figure 20: PFTU configurations on page 179 shows four ways multiple- column systems and PFTUs can be configured.

- connect all the columns in a system to a single PFTU
- connect each column to an individual PFTU
- combine connecting individual columns to individual PFTUs and multiple columns to a single PFTU
- attach additional PFTUs to a PFTU that is connected to one or multiple columns

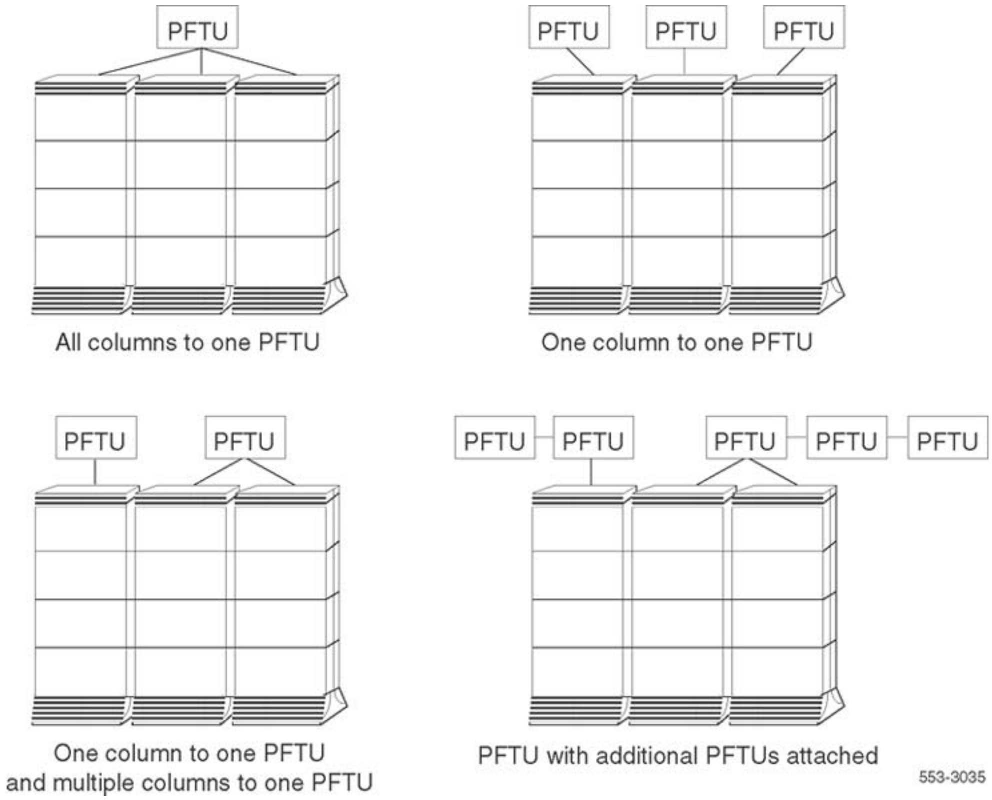

Figure 20: PFTU configurations

Main power loss

The system monitor receives status and control signals from the external power system. The system monitor then generates system messages that indicate the status of main and reserve power supplies.

A reserve (back-up) power supply can be connected to the system: either an Uninterruptible Power Supply (UPS) for AC-powered systems or reserve batteries for DC-powered systems. If the main source of external power is lost, power to the system is maintained by the UPS or reserve batteries.

If the main power supply is lost, the system monitor generates a major alarm. The NT8D22 System Monitor also generates system messages to indicate the system is running on reserve power.

Module power supply failure

There are four types of module power supplies:

- common equipment (CE) power supply
- common/peripheral equipment (CE/PE) power supply
- Intelligent Peripheral Equipment (IPE) power supply
- ringing generator

The NT8D22 System Monitor handles complete or partial failures in a module power supply as follows:

- If the output voltage is higher than the threshold for +5 volts, the affected power supply shuts down, the column LED lights, and a system message is sent.
- If the output voltage is higher than the threshold for other than +5 volts, power for only that voltage shuts down in the affected power supply, the column LED lights, and a system message is sent.
- If the output voltage is lower than the threshold for any voltage, power for only that voltage shuts down in the affected power supply, the column LED lights, and a system message is sent.
- If the input voltage is lower than the threshold, the affected power supply shuts down and then recovers when the input level recovers.

To help pinpoint a power supply problem, the master NT8D22 System Monitor identifies the following:

- the column with the fault (system monitor 0–63)
- the module (0–3) in that column
- the power supply unit (1–2) in the module

Figure 21: Power equipment designations from the master NT8D22 System Monitor on page 181 shows the power equipment designations in a column.

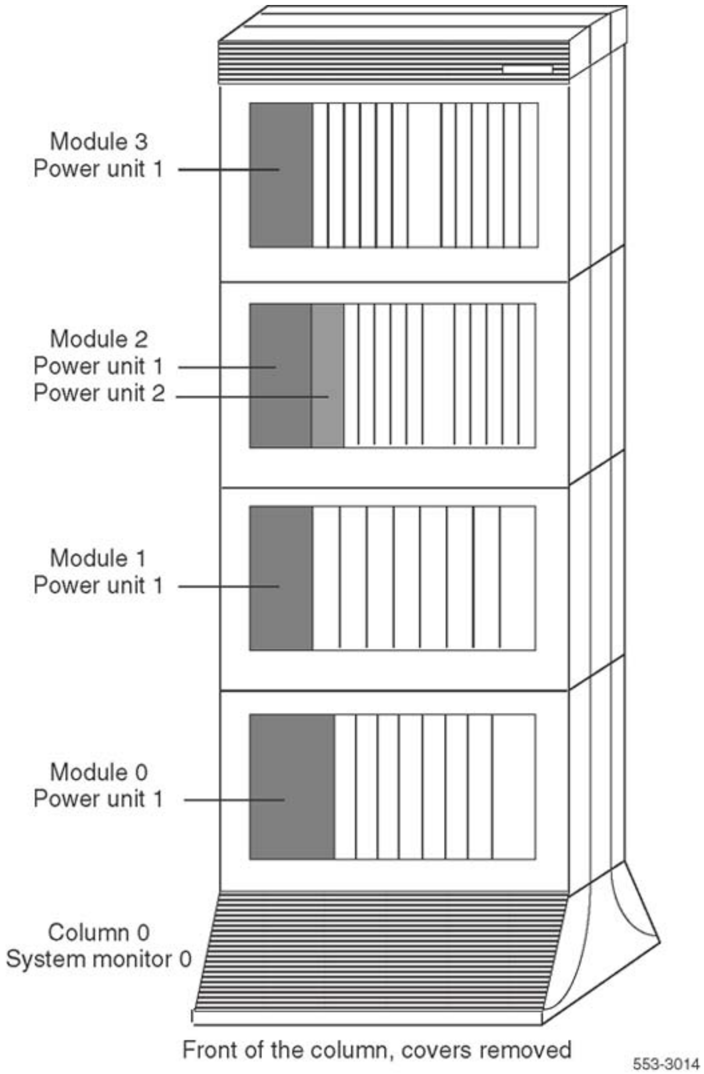

Figure 21: Power equipment designations from the master NT8D22 System Monitor

Temperature alarms

Each column is cooled by a blower unit (NT8D52AB with AC power or NT8D52DD with DC power) in the pedestal. All of these systems are equipped with the NT8D22 System Monitor, which performs the following functions:

- If there is a partial or complete failure in a blower unit, the system monitor lights the column LED and generates a system message.
- If the thermostats in a column report a temperature exceeding 70 degrees C (158 degrees F), the system monitor lights the column LED and generates a system message. Providing this condition exists for 30 seconds, the system shuts down power to the column in 30 seconds.

The NT8D22 System Monitor generates a system message if the air leaving the column exceeds 55 degrees C (131 degrees F). This thermal alarm may indicate a loss of air-conditioning in the room, loss of ventilation in the column, a problem with the blower unit, or a blocked air filter.

Chapter 21: Routine maintenance

Contents

This section contains information on the following topics:

Service batteries and air filters regularly. Follow the guidelines in this chapter to maintain batteries and air filters.

Pedestal air filter

There is an air filter in the pedestal of each column. Service the air filters once a month. For instructions on replacing the air filter, see Replacing equipment on page 187.

If an air filter is damaged in any way, discard it and install a new one. If a dirty air filter is not damaged, clean it with warm water and mild detergent. (Do not use compressed air because it may damage the filter.) When the filter is completely dry, reinsert it in the pedestal or store it as a spare.

Replace the battery pack every three years, even if no battery failures occurred. For instructions on replacing the battery pack assembly, see Replacing equipment on page 187.

DC-power battery systems

External batteries, often used with DC-powered systems, generally require regular visual inspections. They may also require charger or rectifier tests and pilot cell tests. Perform all inspections and tests according to the supplier's instructions.

To comply with safety requirements, consult the following articles before working with any battery systems:

- Read the "Material Safety Data Sheet" that must be posted to meet Occupational Safety and Health Administration (OSHA) requirements. This article outlines appropriate reserve battery handling procedures.

  Refer to National Electric Code 645-10. This article outlines requirements that call for the installation of AC- and DC-power kill switches to battery systems in certain environments.

Preventative maintenance

Avaya recommends that you perform regular preventative maintenance activities. There are two categories of preventive maintenance tasks; monthly tasks and semi-annual tasks.

Monthly preventative maintenance tasks

Perform the following maintenance tasks on a monthly basis:

- Back up customer data to Removable Media Devices (RMDs).
  - Create a backup of the customer data on an RMD and store it on-site.
  - Create an additional back up of the customer data on an RMD and store it off-site.
- Ensure that installation media and system software media are available on-site and stored properly.
- Maintain an adequate room environment by adhering to the following guidelines:
  - Keep the ambient room temperature within established limits.
  - Keep the relative humidity within established limits.
  - Keep the room environment clean and dust free.
  - Take measures to control static electricity; use wrist bands, do not wax floors, and install static mats.
  - Ensure that the room has a functioning lock and is accessible only by authorized personnel.
  - Prohibit the storage of harmful materials in the room, such as caustic cleaning products.

Note:

For more information about proper temperature and humidity levels, see *Avaya Communication Server 1000M and Meridian 1 Large System Planning and Engineering, NN43021-220*.

- If you are using a DC system, follow the manufacturer’s maintenance recommendations to ensure that the batteries function properly.
- If you are using an AC system with an inverter, follow the manufacturer's maintenance recommendations.
- Clean all fan filters.
- Remove all unused cards and install filler plates.
- Review the history logs for undetected problems.
    - Back up history logs to a remote storage site.
    - Update site logs as required by the site
- Apply all recommended patches to the system.
- Review security policies, change passwords, and ensure that authorized personnel have the appropriate access level.
- Map the location of all power transfer sets in the switch room. Test all power transfer sets to verify that they function properly.
- STAT the health of the entire system (including both processors) for all Redundant/High Availability systems.
- • Switch CPUs, if SCPU is not already part of the Daily Maintenance Routines (DROL). Switch the CPUs during a maintenance window defined by business needs. It is critical to perform an Equipment Data Dump (EDD) to create a backup before you issue the SCPU command.
- Ensure two 1FB type analog lines are available; one line for voice communications and a second line connected to a core modem. Test each line to verify that they function properly.

Semi-annual preventative maintenance tasks

Perform the following maintenance tasks on a semi-annual or annual basis:

- Test the backup power using a planned commercial power shut down.
    - Ensure the back up generators for the site function properly.
    - If you are using an AC system with an inverter, ensure the system continues to operate. Ensure all auxiliary equipment continues to operate, including LANs, modems, and terminals.
    - If you are using a DC system, test using a low voltage shut down or at a minimum, test for calculated reserve power time. Ensure all auxiliary equipment continues to operate, including LANs, modems, and terminals.
- Update system software to the current release to provide the latest features and updates.

Chapter 22: Replacing equipment

Content list

This section contains information on the following topics for Avaya Communication Server 1000 (Avaya CS 1000) and Meridian 1 systems:

Replacing CP PM Signaling Server equipment

Replacing a defective Signaling Server

Replacing a defective CS 1000 Release 5.5 Signaling Server requires that you perform a migration of the Signaling Server from one hardware platform to another.

For detailed instructions about how to replace a defective Signaling Server, see *Avaya Signaling Server IP Line Applications Fundamentals, NN43001-125*.

Replacing the hard drive on a CP PM Signaling Server

For detailed instructions about how to replace the hard drive on a CP PM Signaling Server, see *Avaya Signaling Server IP Line Applications Fundamentals, NN43001-125*.

Removing module covers and pedestal grills

Module covers

Follow the steps in Removing front and rear covers on page 189 to remove the front and rear covers from a module.

Removing front and rear covers

1. With a flat-blade screwdriver, turn the lock clockwise on the two locking latches (see Figure 22: Removing the pedestal grill on page 190).
2. Simultaneously push the latches toward the center of the cover and pull the cover forward while lifting it away from the module.

⚠ **Danger:**

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Pedestal grills

Follow the steps in Removing front and rear pedestal grills on page 190 to remove the front and rear grills on the pedestal.

Removing front and rear pedestal grills

1. Loosen the two captive screws that secure the grill.
2. Pull the grill forward and lift it out of the base of the pedestal, as shown in the following figure.

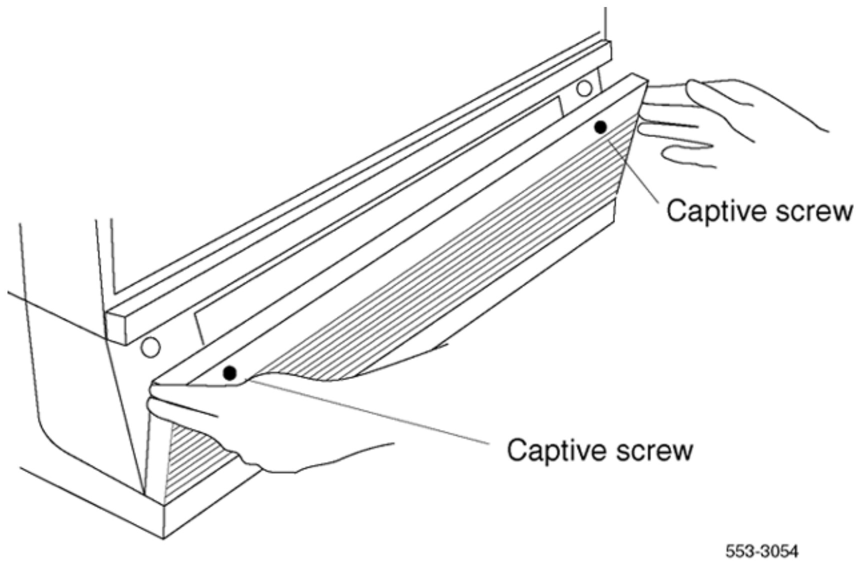

Figure 22: Removing the pedestal grill

Removing UK air exhaust/intake grills

Use the following procedures to remove or replace the exhaust and intake grills on United Kingdom (UK) equipment.

Air exhaust grill

The front and rear air exhaust grills are secured by Southco fasteners located underneath the front edge of the grill. Use a #1 Phillips head screwdriver and turn the fasteners 1/4-turn to release or secure the grill, as shown in the following figure.

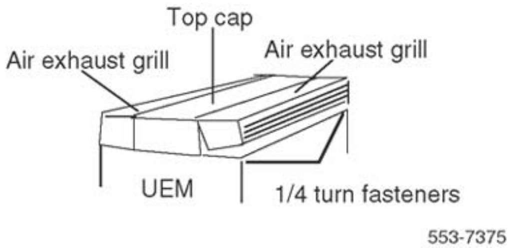

Figure 23: Removing air exhaust grill

Air intake grill

The front and rear air intake grills are secured by captive panel screws located in the face of the grill. Use a slotted screwdriver to release or secure the grill.

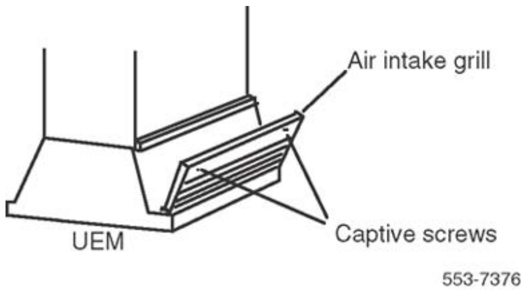

Figure 24: Removing air intake grill

NT1P61 Fiber Superloop Network Card

Follow the steps in Removing and replacing a Fiber Superloop Network card on page 191 to replace an NT1P61 Fiber Superloop Network card.

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

Danger:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Removing and replacing a Fiber Superloop Network card

1. Disable the Fiber Superloop Network card by logging in to the system terminal, loading the Network and Peripheral Equipment Diagnostic Program LD 32, and

executing **DIS loop**, where loop is the actual loop number of the Fiber Superloop Network card.

2. Set the ENB/DIS switch to DIS.
3. Disconnect all the Fiber-optic patchcords and the SDI/System Monitor cable from the card faceplate.
4. Unlatch the card's locking devices by squeezing the tabs and pulling the upper locking device away from the card and pressing the lower locking device downward.
5. Pull the card out of the network module and place it into an antistatic bag away from the work area.
6. Check the replacement card and make sure that the Electro-optical packlets are already installed. If not installed, install the new packlets or remove the packlets from the faulty Fiber Superloop Network card and install them on the replacement card if you are sure that the packlets are not faulty.
7. Set the replacement card ENB/DIS switch to DIS.
8. Hold the replacement card by the card locking devices and insert it partially into the card guides in the module.
9. Pull the upper locking device away from the faceplate on the card and press the lower locking device downward and insert the card firmly into the backplane connector. Press the upper locking device firmly against the faceplate and press the lower locking device upwards to latch the card inside the module.
10. Set the ENB/DIS switch on the Fiber Superloop Network card to ENB. The Fiber Superloop Network card automatically starts the self-test.
11. Observe the red LED on the front panel during self-test. If it flashes three times and stays on, it has passed the test; go on to step 13. If it does not flash three times and stay on, it has failed the test. Pull the card partially out of the module and reinsert it firmly into the module. If the problem persists, troubleshoot or replace the Fiber Superloop Network card. Connect the SDI/System Monitor cable and the Fiber-optic patchcords to the faceplate connectors of the replacement Fiber Superloop Network card.
12. Enable the Fiber Superloop Network card by logging in to the system terminal, loading the Network and Peripheral Equipment Diagnostic Program LD 32, and executing **ENLL loop**, where **loop** is the actual loop number of the Fiber Superloop Network card.
13. Tag the defective card(s) with a description of the problem and prepare them for shipment to your equipment supplier's repair depot.

NT1P62 Fiber Peripheral Controller Card

Follow the steps in Removing and replacing a Fiber Peripheral Controller card on page 193 to replace a Fiber Peripheral Controller card.

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

Danger:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Removing and replacing a Fiber Peripheral Controller card

1. Load Network and Peripheral Equipment Diagnostic Program LD 32.

   At the > prompt, type **`LD 32`** and press the `Enter` key to access the program.
2. Type **`DSXP x`**, where x is the Fiber Peripheral Controller card, and press the `Enter` key to disable the card.

   The Fiber Peripheral Controller card is now disabled and can be removed.
3. Disconnect all the Fiber-optic patchcords from the card faceplate.
4. Unlatch the card's locking devices by squeezing the tabs and pulling the upper locking device away from the card and the lower locking device downwards.
5. Pull the card out of the IPE module or cabinet and place it in an anti-static bag away from the work area.
6. Check the replacement card and make sure that the Electro-optical packlets are already installed.

   If not installed, install the new packlets or remove the packlets from the faulty Fiber Peripheral Controller card and install them on the replacement card if sure the packlets are not faulty.
7. Hold the replacement card by the card locking devices and insert it partially into the card guides in the module.
8. Pull the upper locking device away from the faceplate on the card and the lower locking device downwards and insert the card firmly into the backplane connector.

   Press the upper locking device firmly against the faceplate and the lower locking device upwards to latch the card inside the module.

   The Fiber Peripheral Controller card automatically starts the self-test.
9. Observe the red LED on the front panel during self-test.

   If it flashes three times and stays on, it has passed the test. Go to step 11.

   If it does not flash three times and stay on, it has failed the test. Pull the card partially out of the module and reinsert it firmly into the module. If the problem persists, troubleshoot or replace the Fiber Peripheral Controller card.
10. Connect the Fiber-optic patchcords to the optical connectors of the Fiber Peripheral Controller card faceplate.

For a wall-mounted Fiber Remote IPE, plug the Fiber-optic span FC/PC optical connectors into the FC/PC optical connectors on the Fiber Peripheral Controller card faceplate.

11. At the prompt in the LD 32 program, type **ENXP** x, where x is the Fiber Peripheral Controller card, and press the `Enter` key to enable the card.

    If the uppermost red LED on the Fiber Peripheral Controller card faceplate turns off, the card is functioning correctly and is enabled. The self-test result is also indicated by LD 32 on the MMI terminal connected to the Fiber Peripheral Controller card.

    If the LED stays on, replace the card.

12. Tag the defective card(s) with a description of the problem and prepare them for shipment to the equipment supplier's repair depot.

NT4N65 and NT4N66 cPCI Core Network Interface Cards

This section describes how to replace:

- NT4N65 cPCI Core Network Interface Cards. See Replace the NT4N65 cPCI Core Network Interface (cCNI) card on page 194.
- NT4N66 cPCI Core Network Interface Transition Cards. See Replace the NT4N66 cPCI Core Network Interface (cCNI) Transition Card on page 195.

Replacement procedures

Replace the NT4N65 cPCI Core Network Interface (cCNI) card

1. Check that the Core containing the cCNI card to be replaced is inactive:

    a. The LCD/LED display panel across the top of the Core/Net module core cards has two rows of LEDs.

       If either of the LEDs (top = red or bottom = green) is on for any of the cards, that side is in a test or idle state.

    b. If the Core containing the cCNI is active, switch cores in LD 135:

`LD 135`	To load the program.
`SCPU`	Switch Core (if necessary).

2. In LD 135, software-disable the cCNI card:

`DIS CNI c s p`	Disable the cCNI card, where: c = Core (0 or 1) s = Slot (9 - 12) p = Port (0, 1)

This software-disables both the cCNI card and its associated cCNI Transition card.

3. Hardware-disable the cCNI card.

   Set the faceplate switch to DIS.

4. Use a small-bladed screwdriver to remove the screws from the cCNI card.
5. To remove the card, hold the card by the faceplate latches and gently pull it out of the slot.
6. To install the replacement card, hold the card by the faceplate latches and gently push it into the slot until the connectors make contact with the backplane.
7. Gently push the latches forward to set the card and lock it in place.

   Caution:

   Damage to Equipment

   Never force the card into the slot. It the card gets stuck, remove it and try again.

8. Use a small-bladed screwdriver to replace the screws on the card.
9. hardware-enable the cCNI card: set the faceplate switch to ENB.
10. software-enable the cCNI card:

`LD 135`	To load the program.
`ENL CNI c s p`	Enable the cCNI card, where: c = Core number (0 or 1) s = Slot number (9 - 12) p = Port number (0, 1) This software-enables both the cCNI card and its associated cCNI Transition card.

Replace the NT4N66 cPCI Core Network Interface (cCNI) Transition Card

To replace a cCNI Transition Card, software- and hardware-disable the NT4N65 cCNI card associated with the NT4N66 cCNI Transition Card. It is necessary to disable the cCNI from the inactive core.

1. Check that the Core containing the cCNI card to be replaced is inactive:

   a. The LCD/LED display panel across the top of the Core/Net module core cards has two rows of LEDs.

      If either of the LEDs (top = red or bottom = green) is on for any of the cards, that side is in a test or idle state.

   b. If the Core containing the cCNI Transition card is active, make the other Core active:

`SCPU`	Switch Core (if necessary).

2. In LD 135, software-disable the cCNI card:

`DIS CNI c s p`	Disable the cCNI card, where: c = Core number (0 or 1) s = Slot number (9 - 12) p = Port number (0, 1) This software-disables both the cCNI card and its associated cCNI Transition card.

3. At the front of the module, hardware-disable the NT4N65 cCNI card.

   Set the faceplate switch to DIS.

4. At the back of the module, use a small-bladed screwdriver to remove the screws, located on the top and bottom of the cCNI Transition cards.

   Be careful not to drop the screws into the Pedestal.

   Refer to Figure 25: Core/Net backplane on page 197.

   Note:

   cCNI Transition card replacement is more effective when all the cards are removed as a group, the card changed, and the card group replaced.

5. Remove the four screws that fasten the 3PE Termination Panel to its mounting bracket.
6. Refer to Figure 26: 3PE Termination panel on page 198.
7. Move the 3PE Termination Panel carefully to the left and out of its mounting bracket.
8. Press the card faceplate latches and unseat each card. (The cables are part of the NT4N66 cCNI Transition card assembly.)
9. Remove the NT4N66 cCNI Transition cards, cables, and 3PE Termination panel as an assembly.
10. Disconnect the cCNI Transition Card cable(s) to be replaced from the 3PE Termination panel.

    If removing more than one cable, label the cables to correctly reconnect them later.

11. Install the NT4N66 cCNI Transition cards, cables, and 3PE Termination panel as an assembly.
12. Gently push the latches forward to set the card and lock it in place

    Caution:

    Damage to Equipment

    Never force the card into the slot. It the card gets stuck, remove it and try again.

13. Place the 3PE Termination Panel into its mounting bracket.
14. Install the four screws that fasten the 3PE Termination Panel to its mounting bracket.

15. Use a small-bladed screwdriver to replace the screws on the cCNI Transition cards.
16. At the front of the module, hardware-enable the NT4N65 cCNI card: set the faceplate switch to ENB.
17. software-enable the NT4N65 cCNI card:

`LD 135`	To load the program.
`ENL CNI c s p`	Enable the cCNI card, where: c = Core number (0 or 1) s = Slot number (9 - 12) p = Port number (0, 1) This software-enables both the cCNI card and its associated cCNI Transition card.

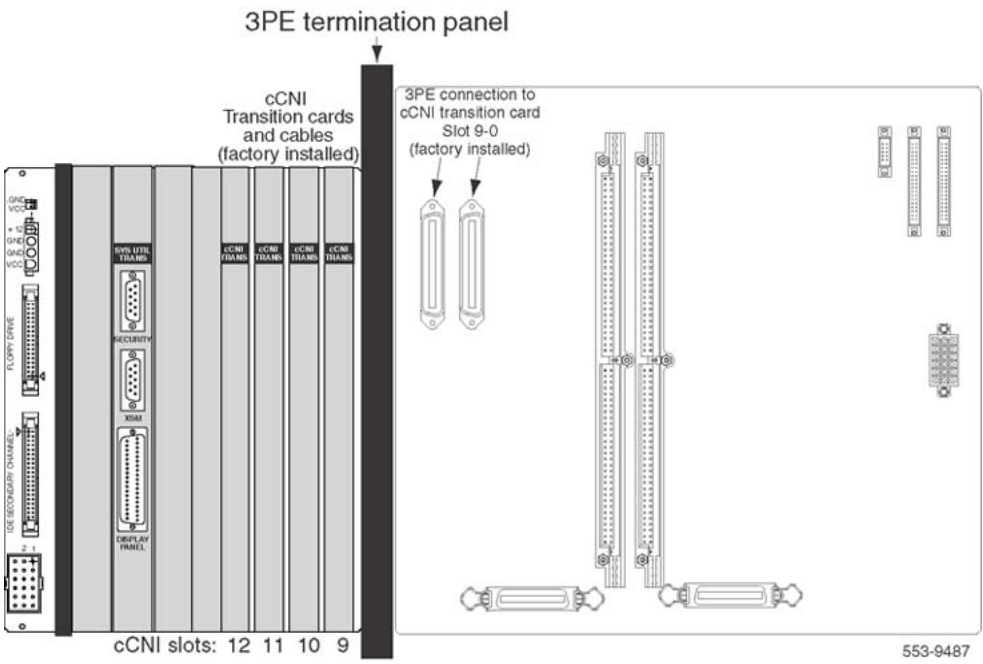

Figure 25: Core/Net backplane

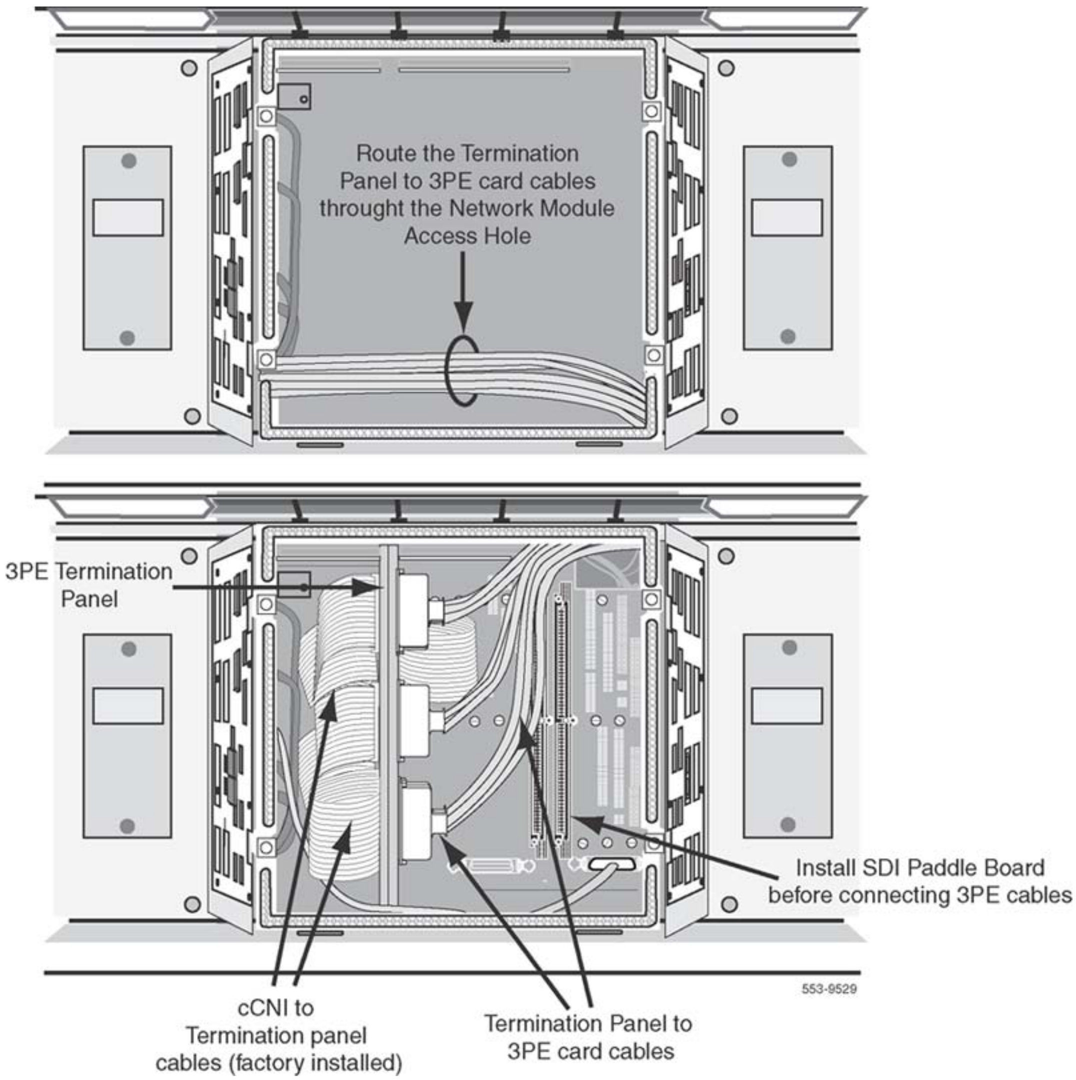

Figure 26: 3PE Termination panel

NT4N67 and NT4N68 System Utility cards

This section describes how to replace:

- NT4N67 cCPI System Utility Cards. See Replace the NT4N67 cPCI System Utility (SYS UTIL) card on page 199.
- NT4N68 cCPI System Utility Transition Cards. See Replace the NT4N68 cPCI System Utility Transition (SYS UTILTRANS) card on page 200.

Replacement procedures

Replace the NT4N67 cPCI System Utility (SYS UTIL) card

1. Check that the Core containing the SYS UTIL card to be replaced is inactive:
   a. The LCD/LED display panel across the top of the Core/Net module core cards has two rows of LEDs.

      If either of the LEDs (top = red or bottom = green) is on for any of the cards, that side is in a test or idle state.
   b. If the Core containing the SYS UTIL is active, switch cores in LD 135:

`LD 135`	To load the program.
`SCPU`	Switch Core (if necessary).

2. In LD 135, split the CPU Cores:

   `SPLIT`
3. In LD 135, on the inactive CP, software-disable the SYS UTIL card:

`DIS SUTL c 15`	Disable the SYS UTIL card, where: c = Core number (0 or 1) This software-disables both the cCPI System Utility card and its associated cCPI System Utility Transition card.

4. Hardware-disable the SYS UTIL card.

   Set the faceplate switch to DIS.
5. Use a small-bladed screwdriver to remove the screws from the SYS UTIL card.
6. To remove the card, hold the card by the faceplate latches and gently pull it out of the slot.
7. To install the replacement card, hold the card by the faceplate latches and gently push it into the slot until the connectors make contact with the backplane.
8. Gently push the latches forward to set the card and lock it in place.

   ⚠ **Caution:**

   Damage to Equipment

   Never force the card into the slot. It the card gets stuck, remove it and try again.
9. Use a small-bladed screwdriver to replace the screws on the card.
10. hardware-enable the SYS UTIL card: set the faceplate switch to ENB.

11. In LD 135, software-enable the SYS UTIL card:

`ENL SUTL c 15`	Enable the SYS UTIL card, where: c = Core number (0 or 1) This software-enables both the cCPI System Utility card and its associated cCPI System Utility Transition card.

12. In LD 135, check status:

`STAT SUTL c 15`	This checks the status SYS UTIL status where: c = Core number (0 or 1) This checks the status of both the cCPI System Utility card and its associated cCPI System Utility Transition card.

13. In LD 135, on the active CP, rejoin the two CP PII cards:

    `JOIN`

Replace the NT4N68 cPCI System Utility Transition (SYS UTILTRANS) card

To replace a System Utility Transition Card, software- and hardware-disable the NT4N67 System Utility card associated with the NT4N68 System Utility Transition Card. Disable the System Utility card from the inactive core.

1. Check that the Core containing the SYS UTIL TRANS card to be replaced is inactive:
    a. The LCD/LED display panel across the top of the Core/Net module core cards has two rows of LEDs. If either of the LEDs (top = red or bottom = green) is on for any of the cards, that side is in a test or idle state.
    b. If the Core containing the SYS UTIL TRANS card is active, make the other Core active:

`LD 135`	To load the program.
`SCPU`	Switch Core (if necessary).

2. In LD 135, split the CPU Cores:

    `SPLIT`

3. In LD 135, on the inactive CP, software-disable the SYS UTIL card:

`DIS SUTL c 15`	Disable the SYS UTIL card, where: c = Core number (0 or 1) This software-disables both the cCPI System Utility card and its associated cCPI System Utility Transition card.

4. At the front of the module, hardware-disable the NT4N67 SYS UTIL card: set the faceplate switch to DIS.

5. Unseat the SYS UTIL card.
6. Remove the two cables, and the security device holder from the faceplate of the SYS UTIL TRANS card.
7. At the back of the module, use a small-bladed screwdriver to remove the screws, located on the top and bottom of the SYS UTIL TRANS card cards.

   Be careful not to drop the screws into the Pedestal.

   Refer to Figure 25: Core/Net backplane on page 197.
8. Install the replaced NT4N68 SYS UTIL TRANS card.
9. Gently push the latches forward to set the card and lock it in place

   ⚠ Caution:

   Damage to Equipment

   Never force the card into the slot. It the card gets stuck, remove it and try again.
10. Use a small-bladed screwdriver to replace the screws on the SYS UTIL TRANS cards.
11. Replace the cables and security device connections to the faceplate of the SYS UTIL TRANS card.
12. Reseat the SYS UTIL card and push the latches to set the card into the backplane connector.
13. At the front of the module, hardware-enable the NT4N67 System Utility card: set the faceplate switch to ENB.
14. In LD 135, on the inactive CP, software-disable the SYS UTIL card:

`ENL SUTL c 15`	Enable the SYS UTIL card, where: c = Core number (0 or 1) This software-enables both the cCPI System Utility card and its associated cCPI System Utility Transition card.

15. In LD 135, on the inactive CP, check the SYS UTIL card status:

`STAT SUTL c 15`	Disable the SYS UTIL card, where: c = Core number (0 or 1) This checks the status of both the cCPI System Utility card and its associated cCPI System Utility Transition card.

16. On the active CP, rejoin the two CP PII cards:

`LD 135`	To load the program.
`JOIN`	

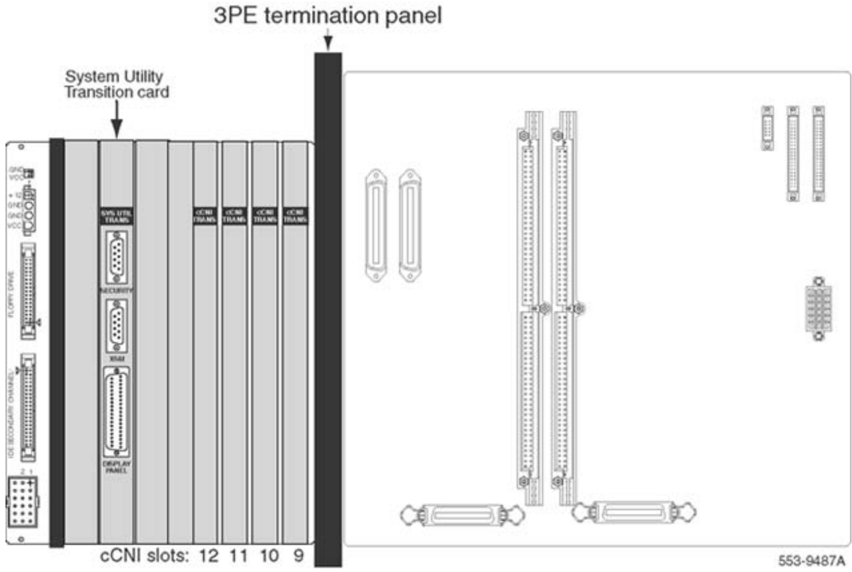

Figure 27: Core/Net backplane

NT4N39 CP PIV Call Processor card

This section describes how to replace the NT4N39 CP PIV Call Processor card.

Replacing the NT4N39 CP PIV Call Processor card

1. To verify that the Call Server that contains the CP PIV card to be replaced is inactive, check the System Utility card maintenance display.
2. If the Call Server that contains the CP PIV card is active, switch cores in LD 135:

Command	Description
LD 135	Load the program.
SCPU	Switch core.

3. Split the cores in LD 135: **SPLIT**
4. Remove all cables connected to the CPU being replaced.
5. Use a small-bladed screwdriver to remove the screws from the CP PIV card.
6. To remove the card, hold it by the faceplate latches and gently pull it out of the slot.
7. To install the replacement card, hold the card by the faceplate latches and gently push it into the slot until the connectors make contact with the backplane.
8. Gently push the latches forward to set the card and lock it in place.

Caution:

Damage to Equipment

Never force the card into the slot. If the card gets stuck, remove it and try again.

9. Use a small-bladed screwdriver to replace the screws on the card.
10. Replace all cables on the replaced CP PIV card.

Important:

Before you continue with this procedure, you must reinstall the software from Compact Flash. For information about reinstalling this software, see *Avaya Communication Server 1000M and Meridian 1: Large System Installation and Configuration (553-3021-210)*, Release 4.5.

11. After the inactive CPU reloads, check the status in LD 135:

    STAT CPU

12. In LD 135, on the active core, rejoin the two CP PIV cards:

    JOIN

13. After the disk sync and memory sync complete, check for normal system operation in LD 135:

    STAT CPU

14. In LD 135, verify that the replaced CP PIV card can control call processing:

    SCPU

15. Switch the CPU back, if necessary.

NT5D12AA Dual DTI/PRI (DDP) card

This section describes how to replace an NT5D12AA DDP card. See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

Danger:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Electrostatic alert:

The static discharge wrist strap located inside the cabinet must be worn before handling circuit cards. Failure to wear the wrist strap can result in damage to the circuit cards.

Removing the DDP card

1. Determine the cabinet and shelf location of the DDP card to be removed.
2. Disable Network Loop by using LD 60. The command is DISL "loop number".

   The associated DCHI may to be disabled first. The faceplate switch S1 should not be disabled until both PRI loops are disabled first.
3. If the DDP card is being completely removed, not replaced, remove data from memory. See *Avaya ISDN Primary Rate Interface Fundamentals (NN43001-569)*.
4. Remove cross connections at the MDF to the wall-mounted cross-connect terminal.
5. Tag and disconnect cables from the card.
6. Rearrange Clock Controller cables, if required.

   ⚠ **Caution:**

   System Failure

   Do not route Clock Controller cables connecting the Clock Controller and DDP card through the center of the cabinet past the power harness. Instead, route them around the outside of the equipment shelves.
7. In the other circuit of a DDP card is in use, DO NOT remove the card.
8. Remove the DDP card if both loops are disabled.

   Switch S1 (faceplate switch) must be in the OFF (DIS) position before removing the card.
9. Package and store the DDP card and cables.

Installing the DDP card

1. Set the option switches on the DDP circuit card before installation.

   See Table 2 below, where bold font indicates factory settings.

Table 39: DDP general purpose switch settings

Switch	Description	S9/S15 Switch Setting
1	Framing mode	off = ESF on = SF
2	Yellow alarm method	off = FDL on = Digit2
3	Zero code suppression mode	off = B8ZS on = AMI
4	Unused	off

SW1 (faceplate switch) must be off (DIS) when installing the DDP. SW1 on the DDP corresponds to the faceplate switch on the QPC414 Network card.

2. Run and connect the DDP cables.

   ⚠ **Caution:**

   System Failure

   Do not route Clock Controller cables connecting the Clock Controller and DDP card through the center of the cabinet past the power harness. Instead, route them around the outside of the equipment shelves.

3. Enable faceplate switch S1. This is the "Loop Enable" switch.

   The faceplate LEDs light for four seconds and go out. The OOS, DIS, and ACT LEDs light again and stay lit.

   If DDCH is installed, the DCH LED flashes 3 times.

4. Run the PRI/DTI Verification Test.

   Refer to *Avaya ISDN Primary Rate Interface Maintenance (NN43001-717)*.

5. Run PRI status check.

   Refer to the *Avaya ISDN Primary Rate Interface Maintenance (NN43001-717)* for the PRI verification tests, DDP self-test, PRI status check, and PRI startup test.

NT5D61 Input/Output Disk Unit with CD-ROM (IODU/C)

This section describes how to replace a faulty IODU/C card.

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

⚠ **Danger:**

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

⚠ **Caution:**

Service Interruption

At some point in this procedure the system warm starts, causing a momentary interruption in call processing.

Before replacing the card, make a backup copy of the customer database on a 4MB diskette by using the data dump routine:

Performing a data dump to back up the customer database

1. Log on to the system
2. Load the Equipment Data Dump Program (LD 43). At the prompt, enter

`LD 43`	To load the program

3. When "EDD000" appears on the terminal, enter

`EDD`	To begin the data dump

4. When "DATADUMP COMPLETE" and "DATABASE BACKUP COMPLETE" appear on the terminal, enter

`****`	To exit the program

Caution:

System Failure

If the data dump is not successful, do not continue; contact the technical support organization. A data dump problem must be corrected before proceeding.

Accessing the cores

1. To access the Core during the replacement procedure, connect a terminal to the J25 port on the I/O panel in the inactive Core Module or Core/Network Module.
2. To communicate with the processor, you must use the following settings on the terminal:
    - 9600 baud
    - 7 data,
    - space parity
    - 1 stop bit
    - full duplex
    - XOFF
3. If using only one terminal or a switch box, switch the connection from Core to Core as needed.

Splitting the Cores

1. Verify that the disk drives are synchronized:

`LD 137`	to load the program
`STAT`	to get the status of the disk drives

If the disks are synchronized, proceed with 2 on page 207. If they are not synchronized, execute the SYNC command:

`SYNC`	Synchronize the drives
`****`	Exit the program

2. Verify that the clock controller associated with the faulty IODU/C is inactive.I

   If it is not, switch clock controllers:

`LD 60`	Load the program
`SSCK`	Get the status of the clock controllers
`SWCK`	Switch clock controllers (if necessary)
`****`	Exit the program

3. Verify that the IODU/C card being replaced is on the inactive Core:

`LD 135`	Load the program
`STAT CPU`	Check CPU status
`TEST CPU`	Test the CPU

   If the IODU/C card being replaced is on the inactive Core, proceed with step 5 on page 207. If the IODU/C being replaced is not on the inactive Core, swap Cores and verify again:

`SCPU`	to swap CPUs
`STAT CPU`	to check CPU status

4. Verify that the faulty IODU/C card is inactive. It may be necessary to switch IODU/Cs.

`LD 137`	
`STAT`	Get the status of IODU/C.
`SWAP`	Switch IODU/Cs (if necessary).

5. Set the MAINT/NORM switch on the CP card to MAINT on the active Core.
6. Set the ENB/DIS switch on all CNI cards to DIS on the inactive Core.
7. Perform the following three steps in uninterrupted sequence:
   a. Press and hold the MAN RST button on the CP card in the inactive Core.
   b. Set the MAINT/NORM switch on the CP card in the inactive Core to MAINT.

c. Release the MAN RST button.

Replacing the IODU/C card in a redundant system

1. Set the ENB/DIS switch on the faulty IODU/C card to DIS.
2. Unhook the locking devices and remove the IODU/C card.
3. Remove the round 1/2" diameter IODU/C Security Device from the black round Security Device holder on the top right corner of the IODU/C card being replaced.
4. Put the IODU/C card being replaced into a static bag and box.
5. With the logo facing upward, slide the Security Device between the security device holder and the holder clip in the new IODU/C card.

   Do not bend the clip more than necessary when inserting the Security Device.

   Ensure that the Security Device is securely in place.
6. Insert the new IODU/C card into the following slots:

   For NT5D21 Core/Net Modules, insert the IODU/C card in slots 17,18, and 19.
7. Lock the locking devices by pushing them gently towards the faceplate. Set the ENB/DIS switch to ENB.

   A blinking letter "E" and number "5" displayed indicates that a failure occurred. In that case, reseat the Security Device in its holder and reinsert the card.
8. Press the MAN RST button on the CP card.

   Once the keycode is validated against the Security Device, the Install menu is displayed.
9. At the Install menu, select <o> to copy the software from the active Core.

```
INSTALL MENU
The Software Installation Tool will install or upgrade Meridian-1
System Software, Database and the PE-ROM (both CP and IOP ROM).
You will be prompted throughout the installation and given the
opportunity to quit at any time.

Please enter:
<CR>-->  <a> - To install Software, CP-BOOTROM, IOP-ROM.
         <b> - To install Software, Database, CP-BOOTROM, IOP-ROM.
         <c> - To install Software only.
         <d> - To install Database only.
         <e> - To install CP-BOOTROM only.
         <f> - To install IOP-ROM only.
         <g> - To reinstall CP-Software.
         <o> - To copy System Software from the other Core.
         <t> - To go to the Tools menu.
         <k> - To install Keycode only.
               For Feature Expansion, use OVL143.
         <q> - Quit.
                                                          553-7784
         Enter choice > o
```

10. Select <a> to confirm.

```
You selected to copy the hard disk /p partition from IODU on Core 1
to IODU on Core 0.
60 MB of disk will be copied.
This wil erase old system files, Database files will NOT be erased.
Note that ERASED FILES CANNOT BE RECOVERED.

NOTE: Copy progress will be indicated by ... , one '.' per MB.

You may Continue with the copy operation or Quit now
and leave your system unchanged.

Please enter:
<CR>-->  <a> -Copy /p partition from one Core 1 to Core 0.
         <q> - Quit.

Enter Choice > a                                          553-7739
```

11. Select <a> to confirm the software release to be copied.
12. When the software is installed successfully, press <CR> to install CP-software from the hard disk to Flash EEPROM, and install CP-BOOT ROM.

    Follow the screen directions until the Main Menu returns.

```
Release: xxxx was installed successfully into /p partition
on your side

NOTE: In order to complete the install you must install flash ROM
      In order to complete the install you must install CP BOOT ROM

Please press <CR> when ready...
                                                          553-7741
```

13. When the Main Menu returns, select <f> to install IOP-ROM.
14. Select <a> to continue with the IOP-ROM upgrade.

```
          You have chosen to Upgrade IOP-ROM in card slot xx from
          the context: x11xxxx to the context: x11xxxx.

          This will replace old IOP-ROM with the ROM image files:
          "/p/os/ioprom".

          You may Continue with ROM upgrade or Quit now and leave ROM
          unchanged.

          Please enter:
<CR>-->   <a> - Continue with ROM Upgrade.
          <q> - Quit.

          Enter choice > a
                                                          553-7787
```

15. At the Install Menu, select the following options in sequence to copy the customer database from the redundant disk.

<d>	to go to the Database menu
<d>	to copy the database from the redundant disk
<y>	to confirm installation status summary
<a>	to confirm database copy

16. Remove the diskette from the IODU/C card and select <q> to quit and reload the system.
17. Select <y> to confirm quit
18. Select <a> to reboot the system.

    The system automatically performs a sysload and system initialization during which several messages appear on the system terminal.

    Wait until initialization has finished (INI messages are no longer displayed on the system terminal) before continuing.
19. In the inactive Core, enable the NT6D65 CNI cards by setting the ENB/DIS faceplate switches to ENB.
20. In the inactive Core, perform the following steps in uninterrupted sequence:

    a. press and release the MAN RST button

    b. when SYS700 messages appear on CP LCD display, set the MAINT/ NORM switch to NORM.

    Within 60 seconds, the LCD displays the following messages, confirming the process.

    RUNNING ROM OS ENTERING CP VOTE

    An "HWI534" message from the CPSI or SDI port indicates the start of memory synchronization. Within 10 minutes, an HWI533 message on the inactive Core CPSI or SDI TTY indicates the memory synchronization is taking place. Wait until the memory synchronization is complete.

21. Switch the NORM/MAINT switch on the active CP card to NORM.
22. Synchronize the disk drives:

`LD 137`	Load the program
`SYNC`	Synchronize the drives. Synchronization may take up to 50 minutes.
`****`	Exit the program

NT5D61 IODU/C Security Device

This section describes how to replace the Security Device on the NT5D61 Input/Output Disk Unit with CD-ROM (IODU/C) Card.

The Security Device is a field-removable component and is located in the upper right corner of an IODU/C card. The device does not contain feature or software release specific information, but it has a unique custom program necessary for each customer. It is intended to serve the customer through numerous upgrade and feature changes.

The Security Device is replaced only if such a replacement is suggested by maintenance and/or diagnostic programs.

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

⚠ **Danger:**

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

⚠ **Caution:**

Service Interruption

At some point in this procedure the system warm starts, causing a momentary interruption in call processing.

Redundant systems

To replace the Security Device, a new Security Device and keycode are required.

On redundant systems, the new keycode must validate against the new and existing Security Device. Therefore, the procedure begins with the validation of the new Keycode against the existing Security Device

Replacing the Security Device on a redundant system

1. To access the Core during the replacement procedure, connect a terminal to the J25 port on the I/O panel in the inactive Core Module or Core/Network Module.

   To communicate with the processor, use the following settings on the terminal:

   - 9600 baud
   - 7 data
   - space parity
   - 1 stop bit
   - full duplex
   - XOFF

   If using only one terminal or a switch box, switch the connection from Core to Core as needed.
2. Use LD 135 to switch to the Core which contains the non-faulty Security Device.

`LD 135`	Load the program
`SCPU`	Switch CPUs (if necessary)
`****`	Exit LD 135

3. Insert the keycode diskette into the floppy drive on the IODU/C with the non-faulty Security Device.
4. In LD 143, print the pending keycode contents.

   Use "KSHO F0" if the keycode is on the diskette in the floppy drive on Core 0, or "KSHO F1" if the keycode is on the diskette in the floppy drive on Core 1:

`LD 143`	Load the program
`KSHO F0` or **`KSHO F1`**	Print the contents of the candidate keycode

5. Perform the KDIF command.

   Use "KDIF F0 REC" if the keycode diskette is inserted in the floppy drive on Core 0, or "KDIF F1 REC" if the keycode is inserted in the floppy drive on Core 1:

`KDIF F0 REC` or **`KDIF F1 REC`**	Print the differences between the candidate and the current keycodes
`****`	Exit LD 143

6. Disable the inactive IODU/C:

`LD 137`	Load the program
`STAT`	Find the status of the IODU/Cs
`DIS CMDU x`	Disable the CMDU part of the inactive IODU/C x
`DIS IOP x`	Disable the IOP part of the inactive IODU/C x

Perform the following steps on the inactive Core.

7. Set the ENB/DIS switch on the IODU/C with the faulty Security Device to DIS.
8. Unhook the locking devices and remove the IODU/C.
9. Remove the round 1/2" diameter IODU/C Security Device from the black round Security Device holder on the top right corner of the IODU/C card.
10. Locate the round 1/2" diameter IODU/C replacement Security Device.
11. Make sure the 8-digit code on the Keycode diskette matches the 8-digit code on the replacement Security Device.
12. With the logo facing upward, slide the replacement Security Device between the security device holder and the holder clip.

    Do not bend the clip more than necessary when inserting the Security Device.

    Ensure that the Security Device is securely in place.
13. For NT5D21 Core/Net Modules, reinsert the IODU/C into slots 17,18, and 19.
14. Lock the locking devices by pushing them gently towards the faceplate.
15. Set the ENB/DIS switch to ENB.

    A blinking letter "E" and number "5" displayed indicates that a failure occurred. In that case, reseat the Security Device in its holder and reinsert the card.
16. Enable the IODU/C in LD 137:

`STAT`	See the status of the IODU/Cs
`ENL CMDU x`	Enable the CMDU part of IODU/C x
`ENL IOP x`	Enable the IOP part of IODU/C x
`STAT`	See the status of the IODU/Cs
`****`	Exit LD 137

17. Perform the KNEW command:

`LD 143`	Load the program
`KNEW HD`	Copy the keycode to the other Core

`****`	Exit the program

18. Time the system reboot for minimal service impact.

    The new keycode does not take effect until the system reboots.

NT5D2103 Core/Network Card Cage

To replace a defective backplane in an NT5D21 Core/Network Module, the card cage must be replaced.

This section describes how to replace the card cage in a redundant system by maintaining system operation with the active CPU and replacing the card cage of the standby CPU. See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

⚠ **Danger:**

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Removing the card cage

1. To access the Cores during the replacement procedure, connect a terminal to the J25 port on the I/O panel in the rear of each Core/Network Module. Use the following settings on the terminal:

    - 9600 baud
    - 7 data
    - space parity
    - 1 stop bit
    - full duplex
    - XON

    If using only one terminal or a switch box, switch the connection from Core to Core as needed.

2. The Call Processor (CP) Card must be inactive in the card cage being replaced.

    a. Check the status of the CP cards:

`LD 135`	Load the program
`STAT CPU`	Determine which CP card is active

    If necessary, switch Cores:

`SCPU`	Switch Cores
`****`	Exit LD 135

b. Set the NORM/MAINT switch to MAINT on the now active CP card.

c. Connect the terminal to the port on the inactive Core.

3. Set the NORM/MAINT switch to MAINT on the CP card in the card cage that is being replaced (the inactive Core).

   Wait 2 minutes for the system to initialize. (A series of INI messages appear on the terminal for the inactive Core.)

4. Disable the clock controller card and any QPC720 Primary Rate Interface or QPC472 Digital Trunk Interface (PRI/DTI) Cards in the card cage being replaced.

   a. Check the status of the clock controller cards:

`LD 60`	
`SSCK x`	"x" is the Core (0 or 1)

If the clock controller card is active, switch to make it inactive:

`SWCK`

Disable the clock controller card:

`DIS CC x`	"x" is the Core (0 or 1)

   b. Set the ENB/DIS switch to DIS on the clock controller card in the card cage being replaced.

   c. Disable any PRI/DTI cards in the card cage being replaced.

`DISL loop`	Disable the network loop and the card
`****`	Exit LD 60

   If the PRI/DTI cards service loops that cannot be out of service, move the cards to a different module and re-enable them.

5. Set the ENB/DIS switch to DIS on all CNI cards and the IODV/C in the card cage being replaced.

6. Follow the steps below to disconnect and remove the NT8D22 System Monitor.

   Do not turn off the blower unit in the front of the pedestals.

   a. Load LD 37 and software-disable the associated SDI port:

`LD 37`	
`DIS TTY x`	Disable the device associated with the port
`****`	Exit LD 37

b. If the card cage being removed is in the column with the master system monitor (column 0), do the following:

   - On the master system monitor (column 0), disconnect the RJ11 cable to J3 and the cable to J6.
   - Pull the system monitor out of the slot.

   If the card cage being removed is in the column with a slave system monitor (should be column 1):

   - On the master system monitor (column 0), disconnect the RJ11 cable to J3 and the cable to J6
   - Pull the system monitor out of the slot.

7. On column 1, disconnect the cables and pull the system monitor out of the slot.

   ⚠ **Caution:**

   Service Interruption

   If the system monitors are not removed, the system may shut down.

8. Turn off power to the module.

   a. For AC power, set the main circuit breaker for the column to OFF (down) in the rear of the pedestal.

      ⚠ **Voltage:**

      DANGER OF ELECTRIC SHOCK

      Due to hazardous voltage in AC-powered systems, power to the entire column must be shut down. This shuts down all functions in the column including the network group in that column. Relocate essential services from this group before proceeding.

   b. For DC power, set the switch on the NT6D41 CE Power Supply to OFF (down). Set the circuit breaker for just this module to OFF (down) in the rear of the pedestal. All other modules in the column retain power.

9. Remove all cards from the module, as follows:

   a. Tag and disconnect all cables to the front of the module.

      Tape over the contacts to avoid grounding.

      Tape or tie all cables to the sides so the working area in front of the card cage is totally clear.

   b. Set the ENB/DIS switch to DIS on any cards that are not already set to disable.

   c. Tag the cards so they can be returned to the same slot in the replacement card cage.

   d. Remove the cards, including the bus terminating units (BTUs) between slots 4 and 5.

10. Disconnect cables to the I/O panels and backplane at the rear of the module, as follows:
    a. Tag and disconnect cables from the I/O panels.
    b. Remove the I/O panels and the I/O safety panel over the backplane to access the rear backplane connectors.
    c. Use the P0741489 Extraction Tool to disconnect cables to the backplane connectors. (See System cable guidelines on page 160.)
11. Disengage the module:
    a. Remove the two mounting screws that secure the rear of the card cage to the module.
    b. Remove the front trim panels on each side of the card cage.
    c. Remove the three mounting screws that secure the front of the card cage to the bottom of the module.
    d. Pull the card cage halfway out of the module.
12. Disconnect power and ground connections at the rear of the module, as follows:
    a. Disconnect the system monitor ribbon cables to J1 and J2.
    b. Disconnect the module power connectors.

       These are small orange connectors plugged into the Module Power Distribution Unit (MPDU) with AC power, or connected to each other with DC power.
    c. Disconnect the logic ground (orange) wire from the backplane bolt.
    d. Disconnect the frame ground (green) wire from the frame ground post.

⚠ Caution:

Service Interruption

Do not disconnect the main power connectors (large orange connectors) at the top and bottom of the module.

13. Pull the card cage all the way out of the module.

Note:

For AC-powered systems, after the card cage is out of the module remove the MPDU and reinstall it on the replacement card cage. The screw-heads for the MPDU are in the wall of the power-supply slot.

14. Remove the floating power connector (the black connector) on the rear of the card cage.
15. Using the same mounting screws and nuts, attach the connector to the new card cage.

Note:

Check the orientation of the connector. Looking at it from the rear of the card cage, the upper-left corner pin should be empty (no wire) and the lower right corner pin should a wire installed. The green wire should be up.

Installing the replacement card cage

1. Set the backplane jumpers in the card cage for Core/Network 0 and Core/Network 1.

   The jumpers are located on the backplane, along the bottom of the front side (the side facing into the card cage assembly):

   a. For Core/Network 0, verify that the jumper between card slots 14 and 15 is closed.

   b. For Core/Network 1, verify that the jumper between card slots 14 and 15 is open.

   ⚠ **Caution:**

   System Failure

   If the Core/Network Module jumpers are set incorrectly, the system does not load and operate correctly.

2. Reposition the EMI shield (it looks like a brass grill) in the base of the module.

   Tape over the front mounting tabs to hold the shield in position. The tape is removed later.

3. Slide the new card cage about halfway into the module.

   Hold the card cage firmly while the ground and power connections are attached at the rear of the module:

   a. Attach the system monitor ribbon cables (J1 goes down to the pedestal, J2 goes up the column).

   b. Attach the frame ground (green) wire to the frame ground post on the module. (A 5/16" socket wrench is needed for this operation.)

      Remove the nut and the lockwasher at the top of the post.

      Put the frame ground connector over the post.

      Reinstall the top lockwasher and the nut, and tighten the nut down.

   c. Attach the logic ground (orange) wire.

      Remove one nut and the lockwasher.

      Put the connector over the post, reinstall the lockwasher and nut, and tighten the nut down. (A 3/8" socket wrench is needed for this operation.)

   d. Connect the module power connectors to the MPDU for AC power, or to each other for DC power.

4. Install the new card cage in the module:
    a. Slide the card cage the remainder of the way into the module.
    b. Check the position of the EMI shield.

       If it has shifted, reposition it.

       Remove the tape holding the EMI shield.
    c. Secure the card cage to the module with the three screws in the front and the two screws in the rear.
5. Replace the trim panels on both sides of the card cage.
6. Install the module power supply in the slot labeled "CE pwr sup" in the Core/Network card cage. Perform a hardware sanity check, as follows:
    a. Turn on power to the module:

       With AC power, set the main circuit breaker to ON (up) in the rear of the pedestal.

       With DC power, set the breaker to ON (up) in the pedestal. Then set the switch to ON (up) on the power supply in the module.
    b. Check the LED pattern for the card cage you are installing:

       On the NT5D2103 card cage, the LEDs are on the front side of the backplane.

       The LEDs are in two vertical columns, one on either side of slot 12 (if necessary, remove the CNI card to view the LEDs).

       The LEDs on the right side of the slot apply to Core 0 and must be (from the top down) OFF-OFF-OFF-OFF.

       Those on the left side apply to Core 1 and must be ON-OFF-OFF-OFF.
    c. Shut down power to the module again.

       With AC power, set the main breaker for the column to OFF (down).

       With DC power, set the switch on the power supply and the pedestal breaker for the module to OFF (down).
7. Install the module power supply in the slot labeled "CE pwr sup" in the Core/Network card cage. Reconnect cables to the backplane as follows:
    a. Reconnect all cables to the backplane connectors.

       Caution:

       Damage to Equipment

       Do not try to insert the cable connector at an angle; pins may be bent or broken.

   b. Route the NTND14 CNI to 3PE cables to the right side (facing the rear) of the module and tie-wrap them to the cable restraint bracket behind the I/O panel.
   c. Position and secure the I/O panels.
   d. Position and secure the I/O safety panel.

8. Reinstall the 3PE card.

   Set the ENB/DIS switch to ENB.

9. Set the ENB/DIS switch on the clock controller card to DIS.

   Seat the clock controller card; leave the ENB/DIS switch set to DIS and do not connect the faceplate cables.

10. Turn on power to the column or the module power supply, as follows:
    a. With AC power, set the main circuit breaker in the pedestal to ON (up).
    b. With DC power, set the breaker to ON (up) in the pedestal. Set the switch to ON (up) on the power supply in the module.

11. Follow the appropriate steps below to connect the clock controller cables:
    a. For a QPC471 Clock Controller card, connect the NT8D79 cables from the primary or secondary reference to the faceplate of the clock controller card.

       For Meridian 1 PBX 81C, connect the NT8D74 cable from the NT8D36 InterGroup Module to the clock controller card.
    b. For QPC775 Clock Controller Cards in Meridian 1 PBX 81C, connect the NT8D74 cable from the junctor board to the faceplate of the clock controller card.

       Then connect the NT8D79 cables from the primary or secondary reference to the faceplate of the clock controller card.
    c. Leave the ENB/DIS switch set to DIS on QPC471 or QPC775 cards.

12. Set the NORM/MAINT switch on the CP card to MAINT. (This keeps the system in split mode when the card is reinstalled.)

13. Reinstall the CP card. As the card performs card-level power-up tests, watch the LCD display and output from the CPSI port for error messages:
    a. Following the "Selftest Complete" message, watch the LCD on the CP card for the message "IOP in Slot 16."
    b. Watch the LCD for the message "Loading Disk OS." As the system attempts to access the hard disk, watch the LCD for error messages.
    c. Watch for system reload (SYS) and initialization (INI) messages on the terminal.

14. Seat all CNI cards, but leave the ENB/DIS switches set to DIS.

15. Load LD 135 and check the status of all configured CNI cards:

`LD 135`	
`STAT CNI`	Get the status of all configured CNIs
`TEST CNI c s`	Test each configured CNI on the inactive side
`****`	Exit LD 135

16. Set the ENB/DIS switch to ENB on the clock controller card.
17. Set the ENB/DIS switch to ENB on all CNI cards.
18. Press and release the MAN RST button on the CP card in the new card cage.
19. When SYS700 messages appear on the LCD display, set the NORM/MAINT switch to NORM.

    Within 60 seconds, the LCD displays the following messages, confirming the process:

    RUNNING ROM OS ENTERING CPU VOTE

    By the active CPU, an HWI533 message from the CPSI or SDI port indicates the memory is shadowed.

    Note:

    At this point, the other Core is still active and in split mode. The Core in the new card cage is the standby (inactive) side. The memories are shadowed (synchronized), but the hard disks are not synchronized (redundancy is disabled).

    Note:

    A CNI port LED may remain lit if a network loop corresponding to that port is disabled.

20. Set the NORM/MAINT switch to NORM on the CP card in the active Core and perform a redundancy sanity test:

`LD 135`	
`STAT CNI`	Get the status of all configured CNIs
`STAT CPU`	Get the status of both Cores
`TEST CPU`	Test the inactive CP card and CP to CP cable
`TEST CNI c s`	Test each configured CNI on the inactive side

    Testing the CP and CNI cards can take 2 minutes or more for each test.

21. Switch Cores and test the other side:

`SCPU`	Switch to Core 0

`TEST CPU`	Test the inactive CP card and CP to CP cable

22. Get the status of the CP cards and memories, and of the CNIs:

`STAT CPU`	Get the status of both Cores
`STAT CNI`	Get the status of all configured CNIs
`****`	Exit LD 135

23. Synchronize the disk drives:

`LD 137`	
`SYNC`	Synchronize the hard disks

Note:

Synchronization may take up to 50 minutes.

24. Test Core functions:

`LD 135`	
`TEST CPU`	Test the inactive CP card and CP to CP cable
`TEST IPB`	Test the backplane protocol on the inactive side
`TEST CNI c s`	Test each configured CNI on the inactive side

If all the tests pass, switch Cores and test the side that is now inactive:

`SCPU`	Switch to the other Core
`TEST CPU`	Test the inactive CP card and CP to CP cable
`TEST IPB`	Test the backplane protocol on the inactive side
`TEST CNI c s`	Test each configured CNI on the inactive side

25. Clear displays, major alarms, and minor alarms:

`CDSP`	Clear the display
`CMAJ`	Clear all major alarms
`CMIN ALL`	Clear all minor alarms
`SCPU`	Switch to the other Core
`CDSP`	Clear the display
`****`	Exit LD 135

26. Software-enable, from the active side, the clock controller and PRI/DTI cards:

a. Enable the clock controller card:

`LD 60`	
`ENL CC x`	
`TRCK aaa`	If necessary, set tracking

b. Enable the PRI/DTI cards:

`ENLL loop`	
`****`	Exit LD 60

27. Reinstall and check the system monitor as follows:

    a. If the card cage in the column with the master system monitor was replaced, reconnect the RJ11 cable to J6 and then the cable to J3. Reinstall the system monitor.

    b. If the card cage in the column with the slave system monitor was replaced, reinstall the system monitor in column 1 first.

    On the master system monitor, reconnect the RJ11 cable to J6 and then the cable to J3. Reinstall the system monitor.

    c. Enter:

`LD 37`	
`STAT XSM`	Check the status of the system monitors
`****`	Exit LD 37

28. Tag defective equipment with a description of the problem and package it for return to a repair center.

NT5K09 Quad Digitone Receiver

This section describes how to replace a defective Quad DIGITONE Receiver Card.

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

Danger:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

⚠ **Caution:**

Service Interruption

Service is interrupted when a loop is disabled.

Removing the Quad DTMF Receiver card

1. Software-disable the Quad DTMF Receiver card by entering

   `LD 32 DISS l s`

   ("l s" represents loop and shelf number)
2. Remove the backplane access plate at the rear of the UEM by removing the screws on each side.

   Set the plate aside.
3. Unhook the locking devices on the card and pull the card out of the card cage.

Installing the replacement Quad DTMF card

1. Check that the plug P2 on the replacement card is oriented in the same way as the card being replaced.
2. Insert the replacement card into the vacated slot and hook the locking devices.
3. Position the backplane access plate.
4. Replace the screws.
5. software-enable each loop on the card by entering **`ENLS l s`**
6. End the session in LD 32 by entering **`****`**
7. Test each loop on the card by entering **`LD 30 LOOP l`**

   If there is a problem, the system issues an NWS message and the appropriate red LED lights on the faceplate of the card.
8. End the session in LD 30 by entering **`****`**
9. Tag defective equipment with a description of the problem and package it for return to a repair center.

NT5K10 Dual Loop Peripheral Buffer Card

This section describes how to replace a defective Enhanced Dual Loop Peripheral Buffer (IDLB) card.

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

Danger:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Caution:

Service Interruption

Service is interrupted when a loop is disabled.

Removing the IDLB card

1. Software-disable the Dual Loop Peripheral Buffer by entering **`LD 32 DISS l s`** ("l s" represents loop and shelf number)
2. Remove the Backplane access plate at the rear of the UEM by removing the screws on each side.

   Set the plate aside.
3. Tag and disconnect cables to the card being removed.
4. Unhook the locking devices on the card and pull the card out of the card cage.

Installing a replacement IDLB card

1. Set option switches on the replacement card in same manner as on the card that was removed.

   To check switch settings, see *Avaya Circuit Card Reference (NN43001-311)*.
2. Insert the replacement card into the vacated slot and hook the locking devices.
3. Connect cables to the replacement card.
4. Position the backplane access plate.

   Replace the screws.
5. software-enable each loop on the card by entering **`ENLS l s`**
6. End the session in LD 32 by entering **`****`**
7. Test each loop on the card by entering **`LD 30 LOOP l`**

   If there is a problem, the system issues an NWS message and the appropriate red LED lights on the faceplate of the card.
8. End the session in LD 30: **`****`**
9. Tag defective equipment with a description of the problem and package it for return to a repair center.

NT5K1106 Enhanced Peripheral Equipment Card Cage

To replace a defective NT5K1102 Enhanced Peripheral Equipment Backplane in the NT5K11 EEPE UEM, it is necessary to replace the NT5K1106 Enhanced Peripheral Equipment Card Cage Assembly.

This section describes how to replace the card cage assembly.

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

Danger:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Removing the card cage

1. Disable the EEPE Enhanced Peripheral Equipment shelf by entering **`LD 32 DISS l s`** (l s c = loop, shelf)

   If a second shelf is assigned to a loop, disable that shelf also by entering **`DISSI 1 s`**

   - If the shelf is in single loop mode, two loops are disabled.
   - If the shelf is in dual loop mode, four loops are disabled.
2. Turn off power to the UEM power supply by setting the switch on the NT5K12 Enhanced Equipment power supply to OFF(left).
3. Remove all cards from the shelf of the UEM:
   a. Tag and disconnect cables to all faceplate connectors.
   b. Tag cards so they can be returned to the same slot. Remove cards.
4. Disconnect cables, plugs, and wires from the back of the UEM to the backplane:
   a. Remove the Backplane access plate by removing the screws on each side. See Figure 28: EEPE access plates (rear view) on page 227.

      Set the panel aside.
   b. Remove all cards from the back of the UEM.
   c. Tag and disconnect cables to all faceplate connectors.
   d. Tag cards so they can be returned to the same slot.

      Remove cards.

e. Tag and disconnect all cables from the backplane to the interior of the I/O assembly.

f. Tag and disconnect all plugs, wires, and cables to the backplane.

5. Remove the two mounting screws that secure the back of the card cage to the UEM assembly.
6. Remove the front cover plates on both sides of the card cage.

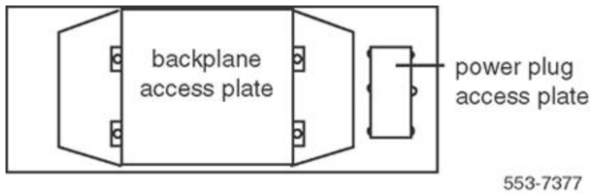

Figure 28: EEPE access plates (rear view)

7. Remove the three mounting screws that secure the front of the card cage to the bottom of the UEM assembly.

   Pull the card cage out of the UEM.
8. Slide the replacement card cage into position in the UEM leaving approximately 3" clearance between the card cage and the backplane.
9. Reconnect cables, plugs, and wires from the UEM to the backplane, as follows:

   a. Connect all cables from the interior of the I/O assembly to the backplane.

   b. Position the backplane access plate. Replace the screws.

   c. Connect all plugs, wires, and cables to the backplane.

Installing a replacement card age

1. Slide the replacement card cage into position in the UEM taking care not to pinch the cables.
2. Install the three mounting screws that secure the front of the card cage to the bottom of the UEM assembly.
3. Replace the front cover plates on both sides of the card cage.
4. Install the mounting screws at the back of the card cage.
5. Reconnect cables, plugs, and wires from the UEM to the backplane, as follows:

   a. Connect all cables from the interior of the I/O assembly to the backplane.

   b. Connect all plugs, wires, and cables to the backplane.
6. Position the power plug access plate.

   Replace the screws.
7. Return cards to their slots at the rear of the UEM.

   Reconnect all cables to connectors.

8. Position the backplane access plate.

   Replace the screws.
9. Return cards to their slots at the front of the UEM.

   Reconnect all cables to connectors.
10. Turn on power to the UEM power supply by setting the power supply switch to ON (right):
11. Enable the shelf by entering **`ENLS l s`**

    If a second shelf is assigned to a loop, enable that shelf also by entering **`ENLS l s`**
12. End the session in LD 32 by entering **`****`**
13. Test the shelf by testing each loop with **`LD 30 LOOP l s`**

    If there is a problem, the system issues an NWS message.
14. End the session in LD 30 by entering **`****`**
15. Tag defective equipment with a description of the problem and package it for return to a repair center.

NT5K21AA Extended Multifrequency Compelled Sender/ Receiver Card

This section describes how to replace a NT5K21AA card in an IPE Modules.

Danger:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Removing the NT5K21AA card

1. software-disable the card: **`LD 32 STAT l s c DIS l s c`** (l s c = loop, shelf, card)

   "NPR011" is displayed on the system terminal when the card is disabled. Busy channels are not disabled until the call is disconnected.

   The LED is lit when the card becomes disabled.
2. Unhook the locking devices on the card and pull the card out of the card cage.

Installing a replacement NT5K21AA card

1. Insert the replacement card into the vacated slot and hook the locking devices.

   When IPE cards are installed, the red LED on the faceplate remains lit for 2 to 5 seconds as a self-test runs. If the self-test completes successfully, the LED flashes three times and remains lit until the card is configured and enabled in software. Then the LED turns off.

If the LED does not follow the pattern described or operates in any other manner (such as continually flashing or remaining weakly lit), replace the card.

2. software-enable the card: **`LD 32 ENLC l s c`** When the process is complete, a system response is displayed.

   `STAT l s c` Obtains the status of the card to ensure that the card is enabled

   `****`

   To exit the program

3. (Optional): Test the card: **`LD 30 SHLF l s`** ("l s" represents loop, shelf number)

   Note:

   This command tests every card on the designated shelf.

   If there is a problem, an NWS system message is generated and the red LED(s) on the faceplate of the card remain lit.

   If there is no problem, exit LD 30.

4. Tag defective equipment with a description of the problem and package it for return to a repair center.

NT6D40, NT6D41, NT6D42, Power Supply DC

This section describes how to replace the following DC power supplies:

- NT6D40 PE Supply DC
- NT6D41 CE Power Supply DC
- NT6D42 Ringing Generator DC

Danger:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Removing the power supply

1. Set the switch on the front of the power supply to OFF (down).
2. Unhook the locking devices on the power supply and pull it out of the card cage.

Installing a replacement power supply

1. Set the switch on the replacement power supply to OFF (down).

On the replacement NT6D42, set option switches in the same manner as on the one that was removed. If there is a vintage change, be sure to check *Avaya Circuit Card Reference (NN43001-311)* for any differences.

2. Insert the replacement power supply into the vacated slot and hook the locking devices.
3. Set the switch on the replacement power supply to ON (up).

   The green LED on the power supply should light and stay lit.
4. Tag defective equipment with a description of the problem and package it for return to a repair center.

NT6D65 and NTRB34 Core to Network Interface Cards

This section describes how to replace the Core to Network Interface (CNI) or Core to Network Interface 3 (CNI-3) card.

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

⚠ **Danger:**

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Before replacing a CNI or CNI-3 card, test it in an unused CNI slot (in case, for example, there is a bent pin on the backplane). If the card works correctly in the new slot, leave it there.

Testing the card in an unused slot

1. The Core associated with the CNI card must be inactive. If it is necessary to switch Cores:

   `LD 135 SCPU`

   Set the NORM/MAINT switch to MAINT on the active CP card.
2. Software-disable the CNI card:

`DIS CNI c s`	c = CPU (0 or 1) s = card slot (8–12)
`****`	Exit LD 135

3. Software-configure the new slot:

   `LD 17`

`EXT x 3PE`	"x" is the number (0–4) of the associated 3PE card(s)
`CNI X s p`	Delete the group(s) associated slot
`CNI s p g`	Add group(s) to new slot
`****`	Exit LD 17
`LD 43`	
`EDD`	Datadump the new configuration
`****`	Exit LD 43

4. Insert the CNI card in the new slot.

   Move the cables to the shrouds on the backplane to the connectors for the new slot.

5. Enable the CNI card and switch the CP cards:

   a. Set the NORM/MAINT switch to NORM on the active CP card.

   b. **`LD 135 ENL CNI c s SCPU ****`**

Follow the steps in Removing a CNI card on page 231 to replace a CNI card.

Removing a CNI card

1. The Core associated with the CNI card must be inactive:

   If it is necessary to switch Cores:

   `LD 135 SCPU`

   Set the NORM/MAINT switch to MAINT on the active CP card.

2. Set the ENB/DIS switch to DIS on the CNI card being replaced.
3. Unhook the locking devices on the card and pull the card out of the card cage.

Installing a replacement CNI card

1. Set the ENB/DIS switch to DIS on the replacement card.
2. Insert the replacement card into the vacated slot and hook the locking devices.
3. Set the ENB/DIS switch to ENB on the replacement card.
4. Set the NORM/MAINT switch to NORM on the active CP card.
5. Software-enable and test the CNI card and configured ports on the card:

`ENL CNI c s`	c = CPU (0 or 1) s = card slot (8–12)
`TEST CNI c s`	
`SCPU`	

* * * *	Exit LD 135

Due to the need to reestablish memory shadowing and contents, the test command may take a minute or more depending on memory size. The LED on the CNI card flashes as the test runs

If there is a problem, a CCED system message is generated (LEDs on the CNI cards stay lit on the inactive Core).

If the network loop corresponding to a CNI port is not enabled, the LED for that port may stay lit.

6. Tag defective equipment with a description of the problem and package it for return to a repair center.

NT7D10 Power Distribution Unit DC

This section describes how to replace the Power Distribution Unit (PDU) for DC-powered systems.

⚠ **Danger:**

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Removing the PDU

1. Disconnect the DC power at the source (not at the PDU).
2. Remove the grill on the rear of the pedestal.
3. Set all five circuit breakers on the PDU to OFF (down).

   The following figure shows the location of the PDU in the rear of the pedestal.

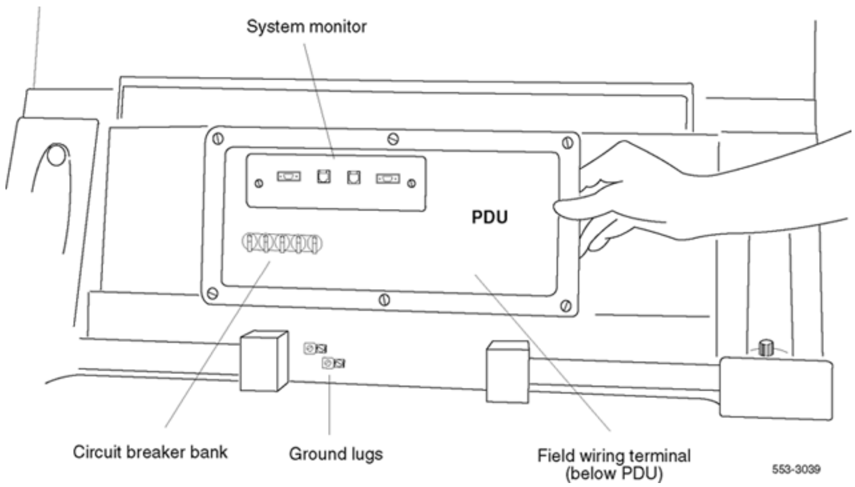

Figure 29: NT7D10 Power Distribution Unit DC

4. Unseat the blower unit in the front of the pedestal, as follows:

    a. Remove the grill on the front of the pedestal. Set the toggle switch on the front of the unit to OFF (left).

    b. Turn the screws on the front of the unit counterclockwise and pull the unit forward several inches so the connector on the rear disengages.

Danger:

Do not pull the blower unit out of the pedestal. The unit is heavy and the blades on the blower may still be rotating up to two minutes after the power is turned off.

5. Disconnect cables that run between the module above the pedestal (module 0) and the top of the PDU, as follows:

    a. Remove the rear cover on the module.

    b. Remove the I/O safety panel over the backplane in the module.

    c. Disconnect the system monitor ribbon cable from the PDU.

    d. Disconnect the large orange power connector (J1) from the PDU.

Note:

To disconnect the power plug, press a latch trip on the front and rear of the plug. It may be necessary to use a screwdriver blade against the latch trip on the front of the plug.

6. Tag and disconnect cables to the NT8D22 System Monitor.

    Loosen the two screws on the system monitor card and remove it from the PDU.

7. Remove the six screws that position the PDU.

    Carefully pull the unit straight forward and set it on the floor next to the pedestal. See Figure 30: Cabling between the PDU and the field wiring terminal block on page 234.

⚠ **Caution:**

Damage to Equipment

The PDU cannot be completely removed from the pedestal until cables to the field wiring terminal block are disconnected. Label wires carefully. Improper wiring can cause system damage.

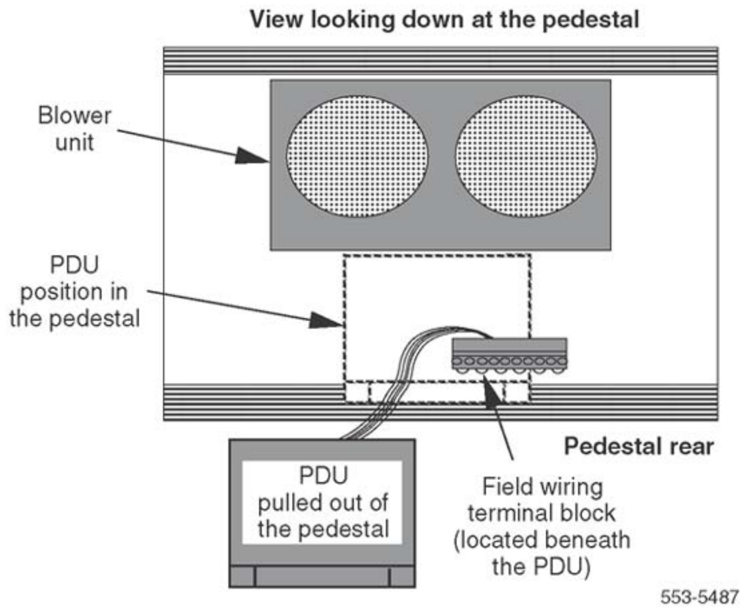

Figure 30: Cabling between the PDU and the field wiring terminal block

8. Remove the field wiring terminal block, as follows:

    a. Remove the cover over the field wiring terminal block.

    b. Locate the frame ground wire that runs from the field wiring terminal block to the frame ground bolt inside the pedestal.

        Disconnect this wire at the terminal block.

    c. Carefully label and disconnect all input wiring to the field wiring terminal block.

        Take special note of any jumper wires that might be installed.

        It is not necessary to disconnect wiring that runs from the terminal block to the PDU.

9. Remove the four screws that secure the terminal block in place and lift it out of the pedestal.

Installing the replacement PDU

1. Install the replacement field wiring terminal block. as follows:

    a. Position the replacement PDU next to the rear of the pedestal.

b. Position the replacement field wiring terminal block and replace its mounting screws.

c. Reconnect all wiring to the field wiring terminal block, including any jumpers that are present on the terminal block that was removed.

d. Reconnect the frame ground wire from the frame ground bolt inside the pedestal to the field wiring terminal block.

e. Replace the cover over the field wiring terminal block.

2. Gently push the PDU into the pedestal. Replace the screws on the PDU.

   Note:

   Be sure to push the unit straight back so that the connector on the rear seats properly with the connector for the blower unit.

3. Reconnect cables from module 0 to the PDU:

   a. Attach power plug J1 and the system monitor cable.

   b. Replace the I/O safety panel on the module.

   c. Replace the rear cover on the module.

4. Reseat the blower unit:

   a. Lift the unit slightly and slide it into the pedestal glides. Set the toggle switch to ON (right).

   b. Tighten the screws on the front of the unit.

5. Insert the system monitor card into the PDU.

   Tighten the screws on the card.

   Reconnect cables to the system monitor faceplate.

6. Set all five circuit breakers on the PDU to OFF (down). Reconnect the source of DC power.

7. One at a time starting with the breaker for the blower unit, set the circuit breakers on the PDU to ON (up).

   Make sure the green LED is lit on the power supply unit(s) in each module.

   Note:

   On initial power up, the blower may rotate slower than expected. As the sensor detects heat, the blower rotates more rapidly.

8. Replace the pedestal grills in the front and rear.

9. Tag defective equipment with a description of the problem and package it for return to a repair center.

NT7D67CB Power Distribution Unit DC

This section describes how to replace the Power Distribution Unit (PDU) for DC-powered systems.

Danger:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Removing the PDU for DC-powered systems

1. Disconnect the DC power at the source (not at the PDU).
2. Remove the grill on the rear of the pedestal.
3. In the rear of the pedestal, set all five circuit breakers on the PDU to OFF (down).

   Figure 31: NT7D67CB Power Distribution Unit DC on page 237 shows the PDU (labeled FLTR/PWR DIST UNIT ASSY on the equipment) and the NT7D10CA System Monitor/Power Supply Assembly (labeled XSM/PWR SUPPLY ASSY on the equipment).
4. Unseat the blower unit in the front of the pedestal, as follows:
   a. Remove the grill on the front of the pedestal. Set the toggle switch on the front of the unit to OFF (left).
   b. Turn the screws on the front of the unit counterclockwise and pull it forward several inches until the L-bracket on the rear of the unit is visible. The connector disengages from the rear of the PDU.

   Danger:

   Do not pull the blower unit out of the pedestal. The unit is heavy and the blades on the blower may still be rotating up to two minutes after the power is turned off.

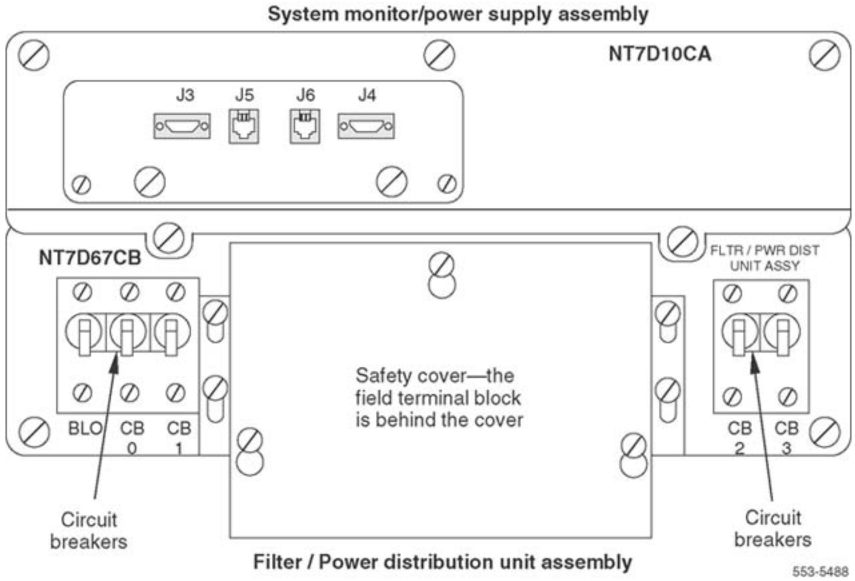

Figure 31: NT7D67CB Power Distribution Unit DC

5. Disconnect cables that run between the module above the pedestal (module 0) and the PDU:
    a. Remove the rear cover on the module.
    b. Remove the I/O safety panel over the backplane in the module.
    c. Disconnect the system monitor ribbon cable from module 0.
    d. Disconnect the large orange power connector (J1) from the PDU.

    Note:

    To disconnect the power plug, press a latch trip on the front and rear of the plug. It may be necessary to use a screwdriver blade against the latch trip on the front of the plug.
6. Tag and disconnect cables to the NT8D22 System Monitor faceplate.
7. Loosen the five screws that secure the NT7D10CA system monitor assembly.
8. Pull the assembly out of the pedestal far enough to disconnect the cables to the PDU, as follows:
    a. Disconnect the small orange connectors (J2 on the PDU, P2 on the system monitor assembly) on the left side of the PDU.
    b. Disconnect the flat white connector to the small circuit board (P1 on the PDU, J1 on the system monitor assembly) on the right side of the PDU.
9. Pull the system monitor assembly out of the pedestal along with the attached ribbon cable and set it aside until the replacement PDU is installed.
10. Remove the plastic safety cover over the terminal block on the PDU as follows:
    a. Loosen the three screws holding the cover.

b. Lift the cover up and over the three mounting screws on the front panel of the cover.

11. Tag and disconnect all wiring to the field wiring terminal block on the PDU. See Figure 32: Field wiring terminals in the NT7D67CB PDU on page 238.

Caution:

Damage to Equipment

Label wires carefully. Improper wiring can cause system damage.

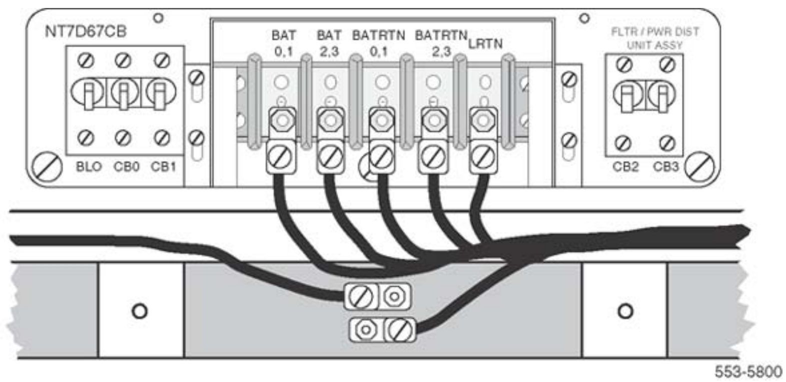

Figure 32: Field wiring terminals in the NT7D67CB PDU

12. Remove the PDU:

Note:

When a system is shipped, a set of screws secures the leveling bracket at the rear of the PDU to protect against vibration during transit. If the shipping screws were not removed during initial installation, remove them now to pull the PDU out of the pedestal. Pull the blower unit all the way out of the pedestal to access the shipping screws on the leveling bracket.

a. Loosen the three screws that secure the PDU.

b. Remove the two vertical screws located in the rear of the PDU that hold the L-bracket to the lower pedestal.

c. Pull the PDU out of the pedestal, being careful to not chafe the cables against the pedestal.

d. Disconnect the frame ground wire from the PDU at the frame ground bolt inside the pedestal.

Installing the replacement PDU for DC-powered systems

1. Install the replacement PDU as follows:

a. Connect the frame ground wire from the PDU to the frame ground bolt inside the pedestal.

b. Guide the connector for the power cable through the hole in the top of the pedestal (do not allow the PDU to drop).

c. Gently push the PDU into the pedestal.

   Position the leveling bracket (attached to the rear of the PDU) in the small opening toward the front of the pedestal.

   The leveling bracket supports the back of the PDU.

2. Install the NT7D10CA system monitor assembly:

   a. Connect the small orange connectors (J2 on the PDU, P2 on the system monitor assembly) on the left side of the PDU.

   b. Connect the flat white connector to the small circuit board (P1 on the PDU, J1 on the system monitor assembly) on the right side of the PDU.

   c. Guide the connector on the free end of the system monitor ribbon cable (from J2) up through the hole in the top of the pedestal and connect it to module 0.

   d. Install and tighten the two vertical screws that attach the L-bracket to the PDU.

   e. Gently push the system monitor assembly into the pedestal.

3. Tighten the screws that secure the PDU and the system monitor assembly.

4. Reconnect the remaining cables from module 0, as follows:

   a. Reconnect the large orange power connector (J1).

   b. Replace the I/O safety panel.

   c. Replace the rear cover to the module.

5. Reconnect all external wiring to the field wiring terminal block on the PDU, as follows:

   Note:

   All wiring to the PDU must be routed within the cable-tie saddles and under the cable restraint bar at the base of the pedestal.

   a. Remove the plastic safety cover over the terminal block.

   b. Connect the red BAT (–48 V) wires to the terminal block:

      - for modules 0 and 1 connect to the BAT 0,1 terminal
      - for modules 2 and 3 connect to the BAT 2,3 terminal

      The safety ground/protective earth wires and all wiring to the block in the PDU must be neatly routed within the cable-tie saddles and under the cable restraint bar at the base of the pedestal. This ensures that there is room to install the PDU cover, safety cover, and rear grill.

   c. Connect the black BATRTN (48 V return) wires to the terminal block:

      - for modules 0 and 1 connect to the BATRTN 0,1 terminal
      - for modules 2 and 3 connect to the BATRTN 2,3 terminal

   d. Connect the orange (or white) wire to the LRTN terminal.

6. Reinstall the plastic safety cover over the terminal block.
7. Reseat the blower unit, as follows:
   a. Lift the unit slightly and slide it into the pedestal glides. Set the toggle switch to ON (right).
   b. Tighten the screws on the front of the unit.
8. Reconnect cables to the system monitor faceplate.
9. Set all five circuit breakers on the PDU to OFF (down).
10. Reconnect the source of DC power.
11. One at a time starting with the breaker for the blower unit, set the circuit breakers on the PDU to ON (up).

    Make sure the green LED lights on the power supply unit(s) in each module.

    Note:

    On initial power up the blower may rotate slower than expected. As the sensor detects heat, the blower rotates more rapidly.
12. Replace the pedestal grills in the front and rear.
13. Tag defective equipment with a description of the problem and package it for return to a repair center.

NT7R51 Local Carrier Interface Card

This section describes how to replace a Local Carrier Interface card.

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

⚠ **Danger:**

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Removing and replacing a Local Carrier Interface card

1. Disable the Local Carrier Interface card by logging in to the system terminal, loading the Network and Peripheral Equipment Diagnostic Program LD 32, and executing **`DISL loop`**, where loop is the actual loop number of the Local Carrier Interface card.
2. Set the ENL/DIS switch to DIS.
3. Disconnect the cable from the Local Carrier Interface card faceplate.

4. Unlatch the card locking devices by squeezing the tabs and pulling the locking devices away from the card.
5. Pull the card out of the network module and place it into an antistatic bag away from the work area.
6. Set the replacement card ENL/DIS switch to DIS.
7. Hold the replacement card by the card locking devices and insert the card partially into the card guides in the module.
8. Pull the upper and lower locking devices away from the faceplate on the card and insert the card firmly into the backplane connector.

   Press the card locking devices firmly against the faceplate to latch the card inside the module.
9. Set the replacement card ENL/DIS switch to ENL.

   The Local Carrier Interface card automatically starts the self-test
10. Observe the red LED on the front panel during self-test.

    If it flashes three times and stays on, it has passed the test. Go to step 11.

    If it does not flash three times and stay on, it has failed the test. Pull the card partially out of the module and reinsert it firmly into the module. If the problem persists, troubleshoot or replace the Local Carrier Interface card.
11. Connect the cable to the Local Carrier Interface card faceplate connector.
12. Enable the Local Carrier Interface card.

    Load the Network and Peripheral Equipment Diagnostic Program LD 32, and executing **`ENLL loop`**, where loop is the actual loop number of the Local Carrier Interface card.
13. Tag the defective card(s) with a description of the problem and prepare them for shipment to the equipment suppliers' repair depot.

NT7R52 Remote Carrier Interface Card

This section describes how to replace a Remote Carrier Interface card.

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

⚠ **Danger:**

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Removing and replacing a Remote Carrier Interface card

1. Load Network and Peripheral Equipment Diagnostic Program LD 32.

   At the > prompt, type **`LD 32`** and press the Enter key to access the program.
2. Type **`DSXP x`**, where x is the Remote Carrier Interface card number, and press the Enter key to disable the card.

   The Remote Carrier Interface card is now disabled and can be removed.
3. Unlatch the card locking devices by squeezing the tabs and pulling them away from the card.
4. Pull the card out of the IPE module or cabinet and place it into an antistatic bag away from the work area.
5. Hold the replacement card by the card locking devices and insert it partially into the card guides in the module.
6. Pull the upper and lower locking devices away from the faceplate on the card and insert the card firmly into the backplane connector.

   Press the card locking devices firmly against the faceplate to latch the card inside the module.

   The Remote Carrier Interface card automatically starts the self-test.
7. Observe the red LED on the front panel during self-test.

   If it flashes three times and stays on, it has passed the test. Go to step 8.

   If it does not flash three times and stay on, it has failed the test. Pull the card partially out of the module and reinsert it firmly into the module. If the problem persists, troubleshoot or replace the Remote Carrier Interface card.
8. At the. prompt in the LD 32 program, type **`ENXP`** x, where x is the Remote Carrier Interface card number, and press the Enter key to enable the card.

   If the upper most red LED on the Remote Carrier Interface card faceplate turns off, the card is functioning correctly and is enabled.

   Self-test results are also indicated by LD 32 on the MMI terminal connected to the Remote Carrier Interface card. If the LED stays on, replace the card.
9. Tag the defective card(s) with a description of the problem and prepare them for shipment to the equipment suppliers' repair depot.

NT8D01 Controller Card

This section describes how to replace a controller card.

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

Danger:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Removing the controller card

1. Turn off power to the module:
   - With AC power, set the associated circuit breaker on the module power supply (MPDU) to OFF (down).

     Note:

     If there are two circuit breakers on the MPDU, the top one is associated with the module power supply, the bottom one with the ringing generator.
   - With DC power, set the switch on the module power supply to OFF (down).
2. software-disable the controller card (and all cards connected to the controller):

`LD 32`	
`DSXP x`	"x" is the controller card number

3. Unhook the locking devices on the card and pull the card out of the card cage.

Installing the replacement controller card

1. Insert the replacement card into the vacated slot and hook the locking devices.
2. Turn on power to the module:

   For AC power, set the associated circuit breaker on the MPDU to ON (up).

   For DC power, set the switch on the module power supply to ON (up).
3. Watch the controller card as it runs a series of self-tests:

   During the tests, the maintenance display on the card shows the code for each test running (see "HEX" in the *Avaya Software Input Output Reference – System Messages (NN43001-712)*.

   If the tests complete successfully, the display begins normal operation. If the card continuously fails a test, the code for that test is displayed.

   When IPE cards are installed, the red LED on the faceplate remains lit for 2 to 5 seconds as a self-test runs.

   If the self-test completes successfully, the LED flashes three times and remains lit until the card is configured and enabled in software. Then the LED goes out. If the LED does not follow the pattern described or operates in any other manner (such as continually flashing or remaining weakly lit), replace the card.

4. Software-enable and test the controller card (and all cards connected to the controller):

   `ENXP x`

   If there is a problem, an NPR, NWS, or SDL system message may be produced and the red LED lights on the controller card.

   If there is no problem, exit LD 32:

   `****`

5. Tag defective equipment with a description of the problem and package it for return to a repair center.

NT8D02, NT8D03, NT8D09, NT8D14, NT8D15, NT8D16 Intelligent Peripheral Equipment Card

Use this procedure to replace the following Intelligent Peripheral Equipment (IPE) cards:

- NT5D11 Line Side T1
- NT5D60AA CLASS Modem Card
- NT5K02 Flexible Analog Line Card
- NT5K07 Universal Trunk Card
- NT5K17 Direct Dial Inward Trunk Card
- NT5K18 Central Office Trunk Card
- NT5K19 EandM Trunk Card
- NT5K20 Tone Detector Card
- NT5K36 Direct Inward/Direct Outward Dial Trunk Card
- NT5K48 Tone Detector Card
- NT5K70 Central Office Trunk Card
- NT5K71 Central Office Trunk Card
- NT5K72 EandM Trunk Card
- NT5K82 Central Office Trunk Card
- NT5K83 EandM Trunk Card
- NT5K84 Direct Inward Dial Trunk Card
- NT5K90 Central Office Trunk Card
- NT5K93 Central Office Trunk Card

- NT5K96 Analog Line Card
- NT5K99 Central Office Trunk Card
- NT8D02 Digital Line Card
- NT8D03 Analog Line Card
- NT8D09 Analog Message Waiting Line Card
- NT8D14 Universal Trunk Card
- NT8D15 EandM Trunk Card
- NT8D16 Digitone Receiver (DTR) Card

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

Danger:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Removing the IPE card

1. Software-disable the card:

   `LD 32`

   `DISI l s c`   l s c = loop, shelf, card

   "NPR011" is displayed on the system terminal when the card is disabled. Busy channels are not disabled until the call is disconnected.
2. Unhook the locking devices on the card and pull the card out of the card cage.

Installing a replacement IPE card

1. Set jumpers on the following replacement cards in the same configuration as on the card that was removed:
   - NT8D14 Universal Trunk Card
   - NT8D15 E&M Trunk Card

   To check settings, see *Avaya Circuit Card Reference (NN43001-311)*.
2. Insert the replacement card into the vacated slot and hook the locking devices.

   Note:

   When IPE cards are installed, the red LED on the faceplate remains lit for 2 to 5 seconds as a self-test runs. If the self-test completes successfully, the LED flashes three times and remains lit until the card is configured and enabled in software. Then the LED goes out. If the LED does not follow the pattern described or operates in any other manner (such as continually flashing or remaining weakly lit), replace the card.

3. software-enable the card:

   `ENLC l s c`

   a. When the process is complete, a system response is displayed.
   b. Exit LD 32:

      ****

4. Test the card:

   `LD 30 SHLF l s`

   This command tests every card on the designated shelf.

   If there is a problem, an NPR system message is generated and the red LED(s) on the faceplate of the card remains lit.

   If there is no problem, exit LD 30:

   ****

5. Tag defective equipment with a description of the problem and package it for return to a repair center.

NT8D04 Superloop Network Card, QPC414 Network Card

This section describes how to replace a superloop network card or network card.

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

⚠ **Danger:**

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

⚠ **Caution:**

Service Interruption

All services on a loop are interrupted while the loop is disabled.

Removing the network card or superloop network card

1. Check the status of each loop on the network or superloop network card:

   `LD 32`

```
STAT loop
```

If the response is DSBL for the loop(s), go to 2 on page 247.

If there are responses other than DSBL, see "LD 32" in *Avaya Software Input Output Maintenance (NN43001-711)* for an interpretation.

2. Set the ENB/DIS switch to DIS.
3. Tag and disconnect cables to the card that is being removed.
4. Unhook the locking devices on the card and pull the card out of the card cage.

Installing the replacement network or superloop network card

1. Set the ENB/DIS switch to DIS on the replacement card.

   On a replacement QPC414, set jumpers the same as on the card you removed. If there is a vintage change, be sure to check *Avaya Circuit Card Reference (NN43001-311)* for any differences.
2. Insert the replacement card into the vacated slot and hook the locking devices.
3. Connect cables to the replacement card.
4. Set the ENB/DIS switch to ENB on the replacement card.
5. Software-enable each loop on the card:

   ```
   ENLL loop
   ```

   When the process is complete, a system response is displayed.

   The card is tested automatically when all loops are enabled.

   If there is a problem, an NWS system message is generated and the red LED on the faceplate of the card flashes (on the NT8D04) or is steadily lit (on the QPC414).

   If there is no problem, exit LD 32:

   ****
6. Tag defective equipment with a description of the problem and package it for return to a repair center.

NT8D06, NT8D21, NT8D29 Power Supply AC

This section describes how to replace the following AC power supplies:

- NT8D06 PE Power Supply AC
- NT8D21 Ringing Generator AC
- NT8D29 CE Power Supply AC

Danger:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Removing the power supply

1. Turn off power to the module power supply:

   If there is a Module Power Distribution Unit (MPDU), set the circuit breaker(s) on the associated MPDU to OFF (down).

   If there are two circuit breakers on the MPDU, the top one is associated with the module power supply and the bottom one with the ringing generator. See Figure 33: Dual circuit breaker and associated module power supplies on page 248.

   If there is no MPDU, set the switch on the power supply faceplate to OFF (down).

2. Unhook the locking devices on the power supply. Wait at least 5 minutes and then pull the power supply out of the card cage.

   Voltage:

   DANGER OF ELECTRIC SHOCK

   Power must discharge. Wait five full minutes before removing the power supply from the module.

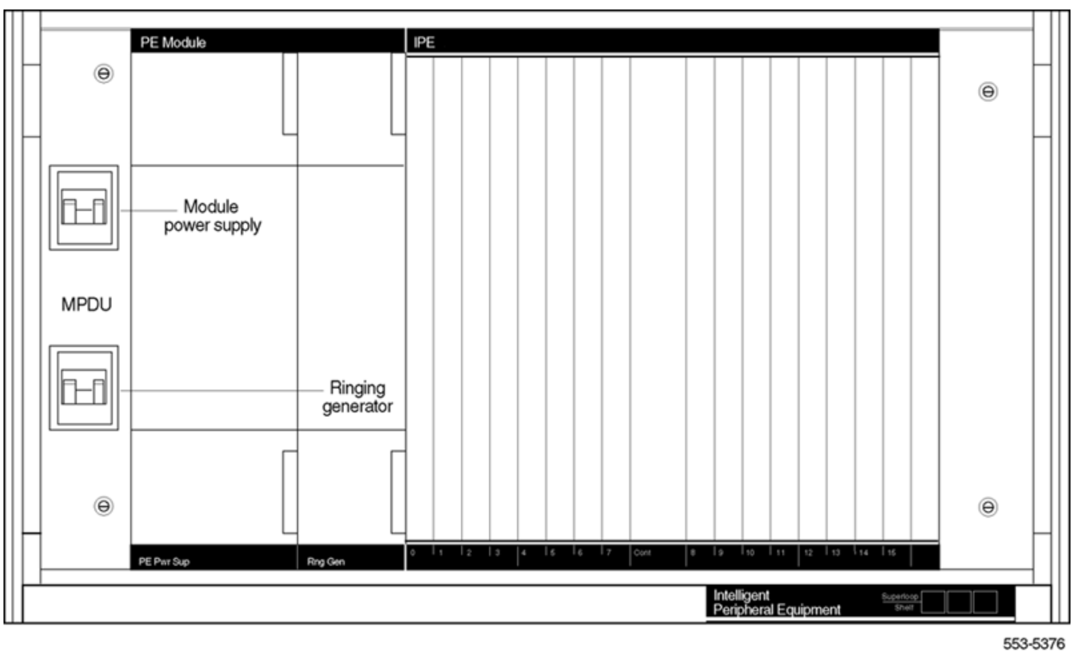

Figure 33: Dual circuit breaker and associated module power supplies

Installing the replacement power supply

1. Insert the replacement power supply into the vacated slot and hook the locking devices.

   Note:

   If there is a switch on the power supply, set the switch to OFF (down) before inserting the power supply.

   Note:

   On a replacement NT8D21, set option strapping the same as on the one that was removed. If there is a vintage change, be sure to refer to *Avaya Circuit Card Reference (NN43001-311)* for any differences.

2. Turn on power to the module power supply. The green LED on the power supply lights and stays lit:

   If there is an MPDU, set the circuit breaker(s) to ON (up).

   If there is no MPDU, set the power supply switch to ON (up).

3. Tag defective equipment with a description of the problem and package it for return to a repair center.

NT8D17 Conference/TDS Card

The conference/TDS card provides conference functions on one loop and both tone and digit switch (TDS) and multifrequency sender (MFS) functions on a second loop. This section describes how to replace a conference/TDS card.

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

⚠ **Danger:**

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Removing the conference/TDS card

1. Software-disable the conference/TDS card:

   `LD 34` or **`LD 38`** or **`LD 46`** or

`DISX loop`	In LD 38, "loop" is the conference loop that is the odd loop of the conference/TDS loop pair. In LD 34 and LD

46, "loop" is the TDS/MFS loop that is the even loop of the conference/TDS loop pair.

Use the command **DISX** to disable both loops and all hardware functions. Disabling loops with the command DISL prevents software from using the loops but does not disable the card.

2. Set the ENB/DIS switch to DIS.
3. Unhook the locking devices on the card and pull the card out of the card cage.

Installing the replacement conference/TDS card

1. Set the ENB/DIS switch to DIS on the replacement card.
2. Set option switches and jumpers on the replacement card with the same configuration as on the card that was removed.

   If there is a vintage change, refer to *Avaya Circuit Card Reference (NN43001-311)* to determine if there are any differences.
3. Insert the replacement card into the vacated slot and hook the locking devices.

   Both red LEDs should flash three times and remain lit if the card is good.
4. Set the ENB/DIS switch to ENB on the replacement card.
5. Software-enable the card:

`ENLX loop`	This prompt is available in LD 34, LD 38, and LD 46. Use the appropriate loop number (see 1 on page 249 in Removing the conference/TDS card on page 249).

   Enable the card with the command ENLX. Enabling the loops with the command ENLL does not enable the card.
6. Test each loop on the card (when each test completes, enter ****):
   a. Test TDS capability:

`LD 34`	
`TDS loop`	"loop" is an even loop number

   b. Test Conference capability:

`LD 38`	
`CNFC loop`	"loop" is an odd loop number

   c. Test MFS capability:

`LD 46`	
`MFS loop`	"loop" is an even loop number

If there is a problem, a TDS, CNF, or MFS system message is generated and the appropriate red LED is lit on the card faceplate.

7. Tag defective equipment with a description of the problem and package it for return to a repair center.

NT8D22 System Monitor

This section describes how to replace the system monitor.

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

Follow the steps below to disconnect and remove the NT8D22 System Monitor.

Caution:

CAUTION

Be sure to follow the steps in this procedure in the order shown. Removing the system monitor before disconnecting cables may result in loss of power and interruption of telephone service.

Removing the system monitor

1. Remove the grill on the rear of the pedestal.

   Do not turn off the blower unit in the front of the pedestals.

2. Load LD 37 and software-disable the associated SDI port:

`LD 37`	
`DIS TTY x`	Disable the device associated with the port
`****`	Exit LD 37

3. Tag and disconnect cables to the system monitor.

   Figure 34: NT8D22 System Monitor in an AC-power pedestal on page 252 shows the location of the system monitor in the rear of an AC-power pedestal.

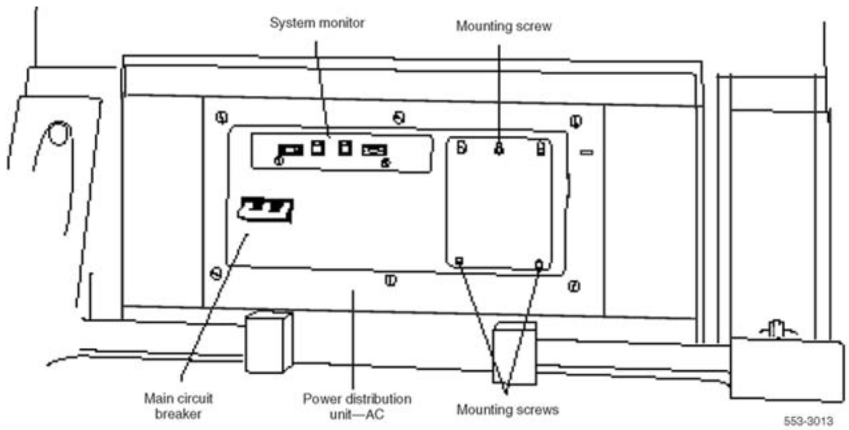

Figure 34: NT8D22 System Monitor in an AC-power pedestal

4. If the card cage being removed is in the column with the master system monitor (column 0), follow the steps below:

    - On the master system monitor (column 0), disconnect the RJ11 cable to J3 and the cable to J6.
    - Pull the system monitor out of the slot.

    If the card cage being removed is in the column with a slave system monitor (column 1), follow the steps below:

    - On the system monitor (column 0), disconnect the RJ11 cable to J3 and the cable to J6.
    - Pull the system monitor out of the slot.

5. On column 1, disconnect the cables and pull the system monitor out of the slot.
6. Loosen the two screws on the card and pull the card out of the slot.

    Note:

    If a slave is removed, the master considers that slave and all slaves with a higher address as disabled. For example, if the slave designated "XSM 2" is disabled, the master also reports slaves 3, 4, and higher are disabled.

Installing the replacement system monitor

1. Set option switches on the replacement card with the same configuration as on the card that was removed.

    If there is a vintage change, refer to *Avaya Communication Server 1000M and Meridian 1 Large System Installation and Commissioning (NN43021-310)* for any differences.

2. Insert the replacement card into the vacated slot and tighten the two screws on the front of the card.
3. Connect cables to the replacement card.
4. Replace the grill on the rear of the pedestal.

5. Load LD 37 and software-enable the associated SDI port:

`LD 37`	
`ENL TTY x`	Enable the device associated with the port
`****`	Exit LD 37

6. Test the system monitor:

   `LD 37 STAT XSM`

   - If a single or master system monitor was replaced successfully, system message "PWR000 XSMC 00 0 0." is displayed.
   - If a slave was replaced successfully, "PWR053 XSMC xx 0 0" ("x" is the system monitor address) is displayed.
   - If there is a problem with a slave, system message "PWR013 XSMC xx 0 0" is displayed.
   - If there is no problem, exit LD 37:

   ****

7. Tag defective equipment with a description of the problem and package it for return to a repair center.

NT8D41 Dual or Quad Port Serial Data Interface paddle board

The Serial Data Interface (SDI) paddle board attaches to the rear of the backplane in an NT6D39 CPU/Network Module. This section describes how to replace an SDI paddle board.

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

Danger:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Caution:

Loss of Data

If the system terminal is assigned to the SDI being replaced, assign it to another port before this SDI is disabled.

Removing the SDI paddle board

1. Software-disable each port on the SDI paddle board:

   `LD 37`

`DIS TTY x`	"x" is the number of the interface device attached to the port

2. Remove the rear cover on the module.
3. Remove the I/O safety panel by turning the screws on each side.

   Set the cover aside.
4. Set the ENB/DIS switch to the disable position (down) on the paddle board.

   ⚠ **Caution:**

   Service Interruption

   To avoid interrupting service, set ENB/DIS switches to DIS before disconnecting or connecting cables.
5. Tag and disconnect cables to the paddle board that is being removed (connector J1 for port 1, connector J2 for port 2).
6. Pull the paddle board out of the connector on the backplane.

Installing the replacement SDI paddle board

1. Set the ENB/DIS switch to the disable position (down) on the replacement paddle board.
2. Set option switches on the replacement paddle board with the same configuration as on the board that was removed.
3. If there is a vintage change, refer to *Avaya Circuit Card Reference (NN43001-311)* for any differences.
4. Plug the replacement paddle board into the vacated connector on the backplane.
5. Connect cables to the replacement paddle board.
6. Set the *ENB/DIS* switch to the enable position (up) on the replacement paddle board.
7. Replace the I/O safety panel. Replace the rear cover on the module.
8. Software-enable and test each port on the paddle board:

   `ENL TTY x TTY x`

   If there is a problem, an IOD system message is generated and the red LED lights on the faceplate of the card.

   If there is no problem, exit LD 37:

****

9. Tag defective equipment with a description of the problem and package it for return to a repair center.

NT8D46AC Thermostat Harness

This section describes how to replace the thermostat harness located in the top cap of each column.

⚠ **Danger:**

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Removing the thermostat harness

1. Disconnect the system monitor from the circuit breaker system:
    a. Remove the grill on the rear of the column pedestal.
    b. Loosen the two screws on the system monitor and pull it out a few inches.

    ⚠ **Caution:**

    Service Interruption

    If the system monitor is not unseated, column operation shuts down when the thermostat harness is disconnected.
2. Disconnect power to the top cap:
    a. Remove the rear cover on the module below the top cap.
    b. Remove the I/O safety panel over the backplane.
    c. At the top of the rear of the module, disconnect the connector from the module power harness.
    d. Disconnect the pin headers on connector J2 on the backplane; disconnect the ribbon cable connector.
3. Remove the top cap:
    a. Remove air exhaust grills at the front and rear of the top cap.

    See Figure 35: Air exhaust grills on the top cap on page 256.

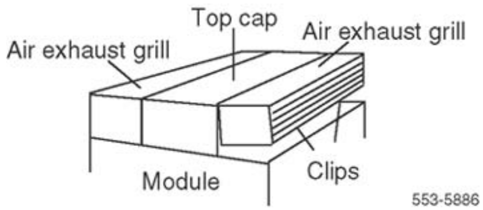

Figure 35: Air exhaust grills on the top cap

Pull forward on the two clips underneath the front edge of each grill and lift up to remove the grill.

b. Use a 5/16" socket wrench to remove the six bolts that secure the top cap and perforated panel.

See Figure 36: Top cap assembly on page 256.

Lift off the top cap only.

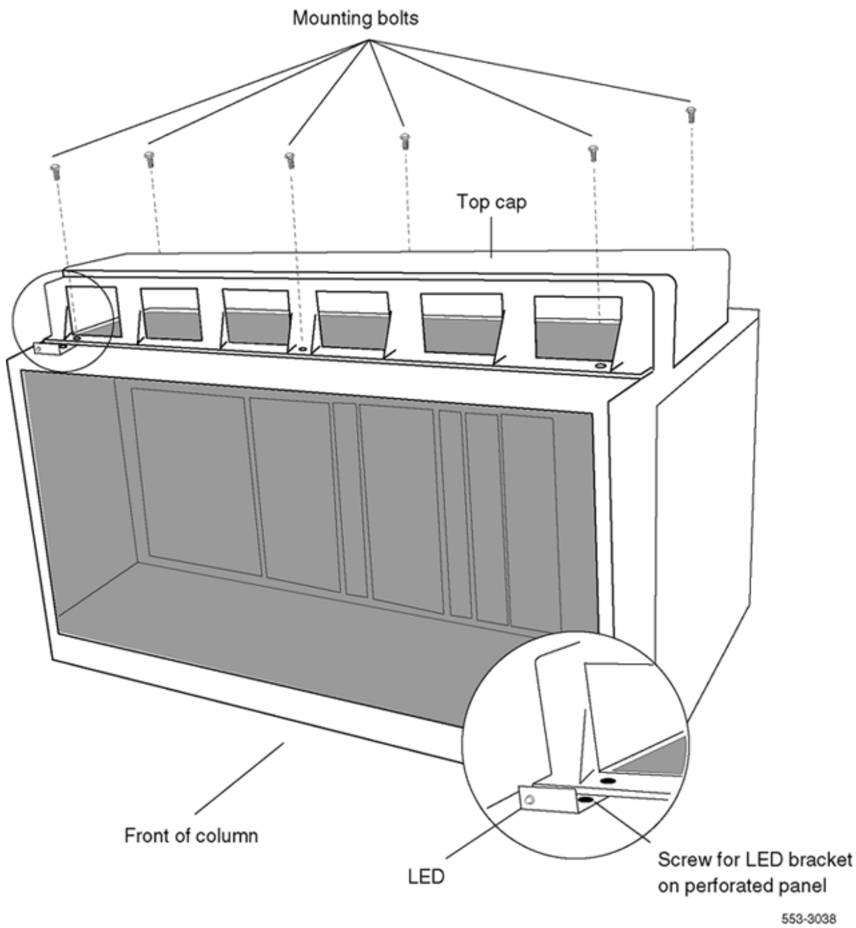

Figure 36: Top cap assembly

4. Remove the thermostat harness:

Note:

The column LED and LED wiring are part of the thermostat harness.

a. Pull the LED ring away from the LED mounting bracket.

   See Figure 37: Mounting for the column LED on page 257.

   It may be necessary to loosen it with a standard screwdriver.

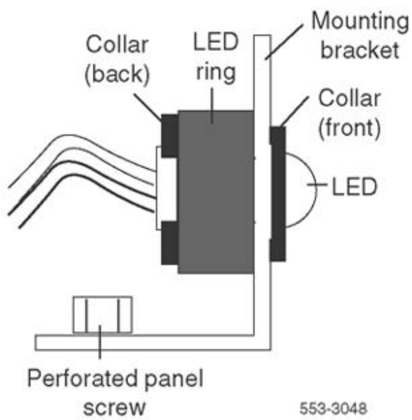

Figure 37: Mounting for the column LED

b. Push the LED back completely out of the collar on the LED mounting bracket.
c. Remove the LED ring by pulling it forward over the LED.

   Keep the ring handy; it is used with the replacement equipment.
d. Remove the screw that secures the perforated panel at the LED mounting bracket.
e. Slide the perforated panel slightly to the left (looking at it from the rear of the column).

   Lift the panel and turn it over.
f. Clip all cable ties that secure the thermostat harness.

   Be careful not to damage other wiring (such as the air probe harness).
g. Pull the LED through the rubber grommet at the front of the perforated panel.
h. Remove the screws (two each) that secure the thermostats. Remove the thermostats and wiring.

   Pull forward on the two clips underneath the front edge of each grill and lift up to remove the grill.
i. Use a 5/16" socket wrench to remove the six bolts that secure the top cap and perforated panel.

   See Figure 36: Top cap assembly on page 256.

Lift off the top cap only.

See Figure 38: Thermostat harness on page 258.

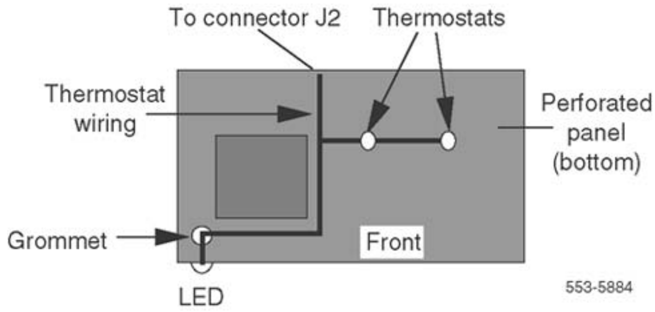

Figure 38: Thermostat harness

Installing the replacement thermostat harness

1. Install the replacement thermostat harness:

    a. Position the replacement thermostats and install the screws.

    b. Push the LED through the rubber grommet.

    c. Route the thermostat wiring on the perforated panel.

    d. At the rear edge of the panel, route the wires with wiring for the air probe harness.

    Secure loose wiring to the perforated panel with cable ties.

2. Turn the perforated panel over.

    Slide it slightly to the right (at the rear of the column) so it is in a secure position.

    Position wiring from the perforated panel so it rests in the cable well next to the orange connector at the rear of the module. See Figure 39: Routing the thermostat harness from the top cap on page 259.

    Position the perforated panel and install the screw that secures it at the LED mounting bracket.

    a. Slide the LED ring over the LED.

    See Figure 40: Installing the column LED on page 259. The ring hangs loosely at this point.

    b. Gently push the LED forward completely through the collar on the LED mounting bracket.

    c. Push the LED ring into position over the back of the collar and tight against the LED mounting bracket.

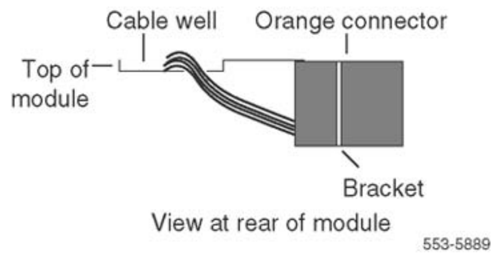

Figure 39: Routing the thermostat harness from the top cap

3. Install the top cap:
   a. Position the top cap and install the six bolts that secure the top cap and perforated panel.
   b. Install the air exhaust grills at the front and rear of the top cap.

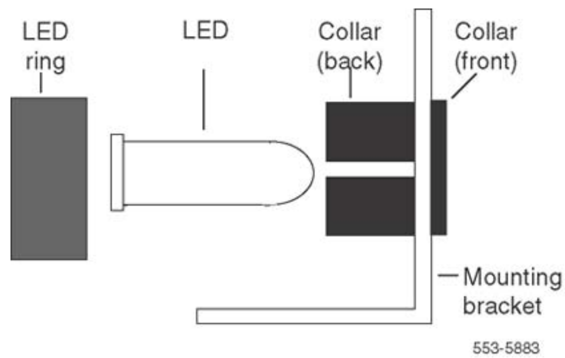

Figure 40: Installing the column LED

4. Reconnect power to the top cap:
   a. Connect the ribbon cable connector to connector J2 on the backplane.

      Line up the alignment tab on the connector and snap on the pin headers to position the connector correctly.

      See Figure 41: Aligning the thermostat harness connector on page 259.

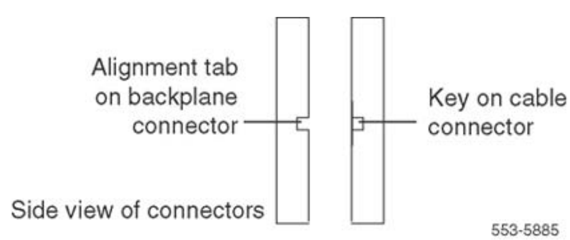

Figure 41: Aligning the thermostat harness connector

   b. Connect the orange connector to the module power harness.
   c. Replace the rear cover on the module.
5. Reconnect the system monitor to the circuit breaker system:

a. Push the system monitor into position and tighten the screws.

b. Replace the grill on the pedestal.

6. Tag defective equipment with a description of the problem and package it for return to a repair center.

NT8D46AM, NT8D46DC Air Probe Harness

This section describes how to replace the air probe harness located in the top cap of each column.

Danger:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Removing the air probe harness

1. Disconnect the air probe harness plug:
   a. Remove the rear cover on the module below the top cap.
   b. Remove the I/O safety panel over the backplane.
   c. At the top of the rear of the module, disconnect the orange connector from the module power harness.
2. Remove the top cap:
   a. Remove air exhaust grills at the front and rear of the top cap.

      Pull forward on the two clips underneath the front edge of each grill and lift up to remove the grill.

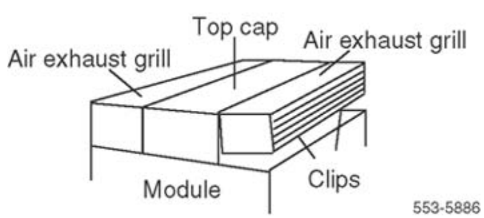

Figure 42: Air exhaust grills in the top cap

   b. Use a 5/16" socket wrench to remove the six bolts that secure the top cap and perforated panel.

      See Figure 43: Top cap assembly on page 261.

      Lift off the top cap.

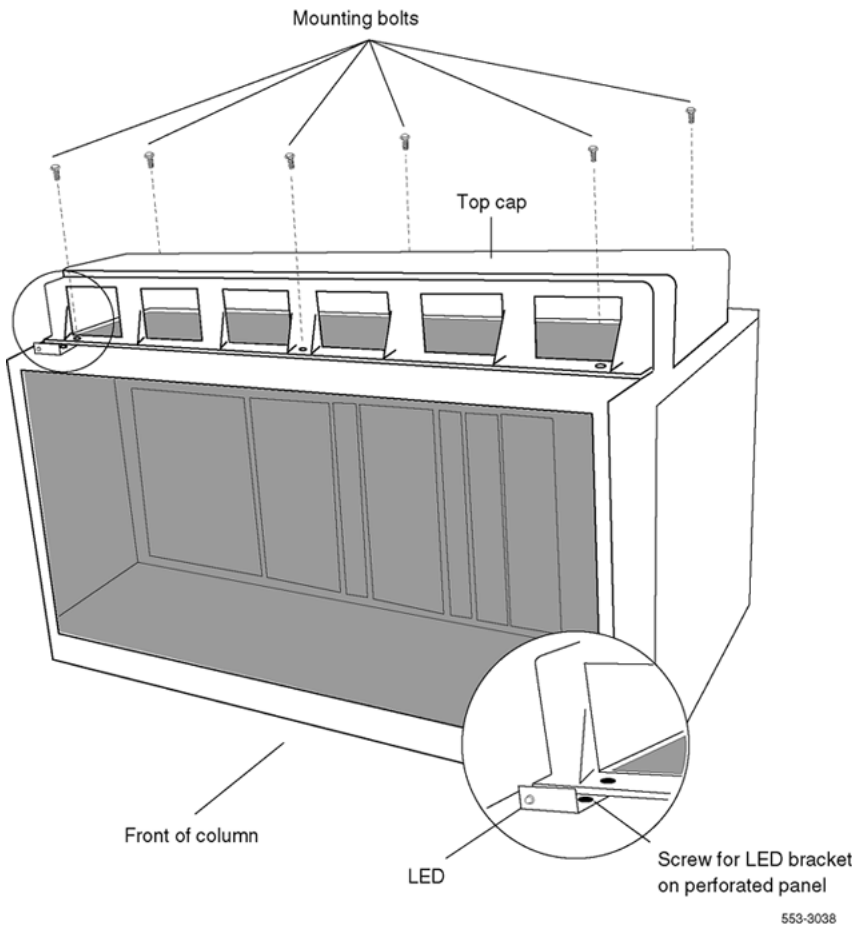

Figure 43: Top cap assembly

3. Remove the air probe harness:

   a. Remove the screw that secures the perforated panel at the LED mounting bracket.

   b. Slide the perforated panel slightly to the left (looking at it from the rear of the column). Lift the panel and turn it over.

   c. Pull the air probe out of the clip holder. See Figure 44: Air probe harness on page 262.

   d. Clip cable ties that secure the air probe wiring.

      Be careful not to damage other wiring (such as the thermostat harness).

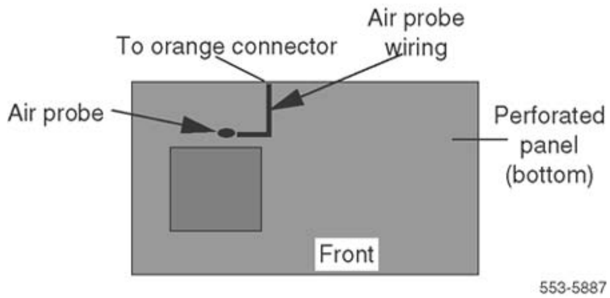

Figure 44: Air probe harness

e. Remove the orange connector from the right-angle bracket at the top of the module.

   Simultaneously push the four small snaps (two on each side) on the connector to release it from the bracket. See Figure 45: Connector for the air probe harness on page 262.

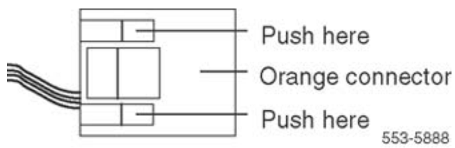

Figure 45: Connector for the air probe harness

Installing the replacement air probe harness

1. Install the replacement air probe harness:

   a. Gently push the air probe into the clip holder.

   b. Route the air probe wiring on the perforated panel.

      At the rear edge of the panel, route the wires with wiring for the thermostat harness. Secure loose cabling to the perforated panel with cable ties.

   c. Turn the perforated panel over.

      Slide it slightly to the right (at the rear of the column) so it is in a secure position.

      Position wiring from the perforated panel so it rests in the cable well next to the orange connector at the rear of the module. See Figure 46: Routing the air probe harness from the top cap on page 263.

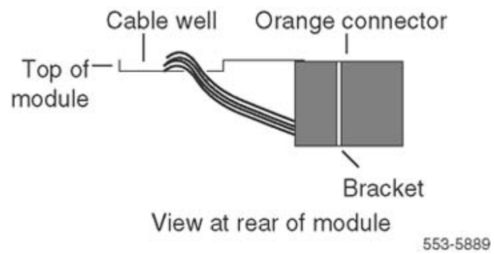

Figure 46: Routing the air probe harness from the top cap

   d. Insert the orange connector into the right-angle bracket at the top of the module.

      Simultaneously push the four small snaps on the connector to insert it.

2. Install the top cap and perforated panel:

   a. Position the perforated panel and install the screw that secures it at the LED bracket.

   b. Position the top cap and install the six bolts that secure the top cap and perforated panel.

   c. Install the air exhaust grills at the front and rear of the top cap.

3. Reconnect the air probe harness plug:

   a. Connect the orange connector to the module power harness.

   b. Replace the I/O safety panel.

   c. Replace the rear cover on the module.

4. Tag defective equipment with a description of the problem and package it for return to a repair center.

NT8D52AB, NT8D52DD Pedestal Blower Unit

This section describes how to replace a blower unit.

Removing the blower unit

1. Remove the front pedestal grill and set it aside.

   Figure 47: NT8D52 Blower Unit on page 264 shows the blower unit and its location in the front of the pedestal.

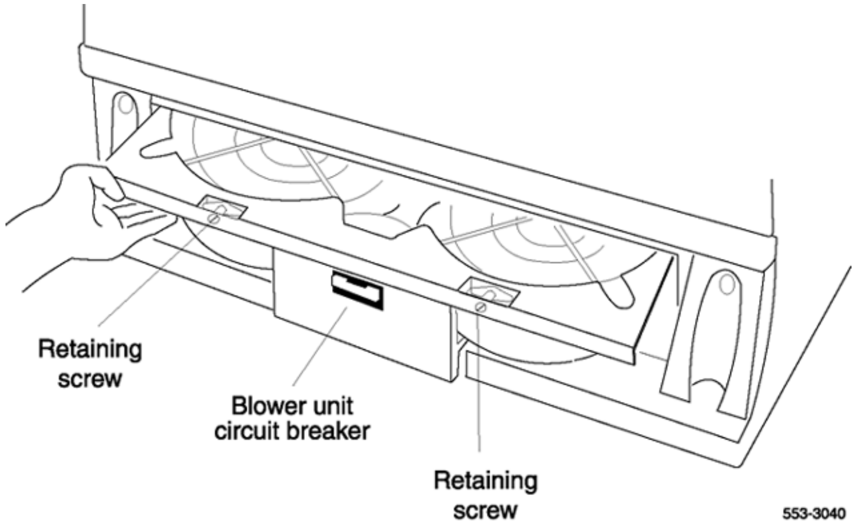

Figure 47: NT8D52 Blower Unit

2. Turn off power to the blower unit:
   - With AC power, set the circuit breaker on the front of the unit to OFF (down).
   - With DC power, set the toggle switch on the front of the unit to b (left).

   Danger:

   Impellers in the blower unit do not stop instantly when the power is turned off. Wait two full minutes before removing the unit.
3. Loosen the two screws on the front of the blower unit by turning them counterclockwise.
4. Grasp the lip at the top edge of the blower unit.

   Slide the unit out of the glides and onto the bottom ledge of the pedestal.

   Lift the unit out of the pedestal.

   Store the blower unit in an upright position.

Installing the blower unit

1. Set the replacement blower unit on the bottom ledge of the pedestal.
2. Tilt the back of the blower unit up slightly so that it slides into the pedestal glides. It may be necessary to lift the unit.

   Gently push the unit into position.
3. Tighten the screws on the front of the unit.
4. Turn on power to the blower unit:
   - With AC power, set the circuit breaker to ON (up).
   - With DC power, set the toggle switch to ON (right).

Note:

On initial power up the blower may rotate slower than expected. As the sensor detects heat, the blower rotates more rapidly.

5. Fit the grill into the holes in the bottom ledge of the pedestal.

   Push the grill back into a locked position.

6. Tag defective equipment with a description of the problem and package it for return to a repair center.

NT8D53CA Power Distribution Unit AC

This section describes how to replace the Power Distribution Unit (PDU) for AC-powered systems.

Danger:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Removing the PDU

1. Turn off power at the distribution box. If the column is not hardwired, unplug the power cable.
2. Remove the grill on the rear of the pedestal. Figure 48: NT8D53CA Power Distribution Unit AC on page 265 shows the location of the unit in the rear of the pedestal.

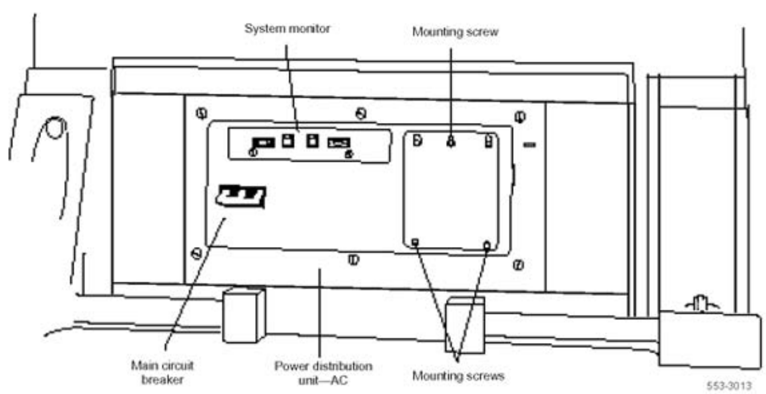

Figure 48: NT8D53CA Power Distribution Unit AC

3. Loosen the three mounting screws that secure the field wiring access plate. Lift the plate over the screws and set it aside.

4. Tag and disconnect wiring to the LRTN, GND, L2, and L1 connections on the right side of the field wiring terminal.

   See Figure 49: Connections at the field wiring terminal on page 266.

   Push all the wires down into the empty area under the pedestal

   ⚠ Caution:

   Damage to Equipment

   Label wires carefully. They must be reconnected correctly or the system may be damaged.

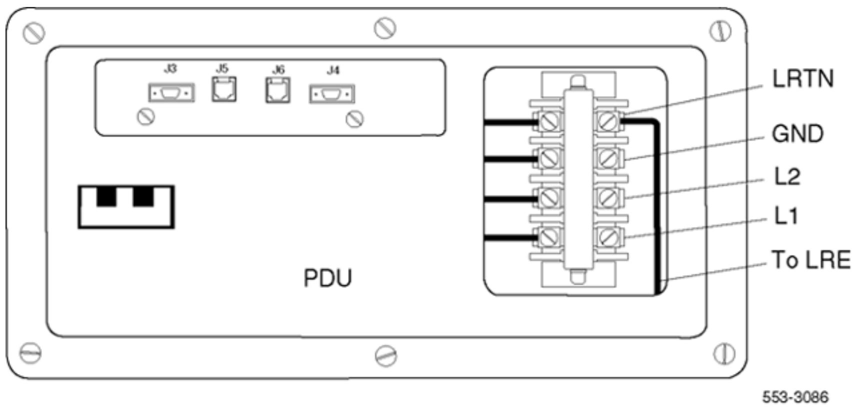

Figure 49: Connections at the field wiring terminal

5. Tag and disconnect cables to the NT8D22 System Monitor.

   Loosen the two retaining screws on the system monitor.

   Remove the card.

6. Disconnect cables to the module above the pedestal (module 0):

   a. Remove the rear cover on the module.

   b. Remove the I/O safety panel over the backplane in the module.

   c. Disconnect the power plug (J1) and system monitor ribbon cable to the module.

      Note:

      To disconnect the power plug, press a latch trip on the front and rear of the plug. It may be necessary to use a screwdriver blade against the latch trip on the front of the plug.

7. Remove the six screws that position the PDU.

   Carefully pull the unit straight forward out of the pedestal.

Installing the replacement PDU

1. Set the main circuit breaker on the replacement PDU to OFF (down).
2. Position the replacement PDU and gently push it into the pedestal.

   Note:

   Push the unit straight back, so that the connector on the rear seats properly with the blower unit connector. It may be easier to position the PDU by temporarily pulling the blower unit out several inches.
3. Reconnect cables to module 0:
   a. Attach power plug J1 and the system monitor cable.
   b. Replace the I/O safety panel.
   c. Replace the rear cover.
4. Insert the system monitor.

   Tighten the screws on the card.

   Reconnect cables to the system monitor faceplate.
5. Connect wiring to the right side of the field wiring terminal.
6. Position the field wiring access plate over the three mounting screws.

   Tighten the screws.
7. Turn on power at the distribution box or plug in the power cable.
8. Set the main circuit breaker to ON (up).
9. Replace the pedestal grill.
10. Tag defective equipment with a description of the problem and package it for return to a repair center.

NT8D56AA, NT8D56AC, NT8D57 Module Power Distribution Unit

This section describes how to replace the following Module Power Distribution Units (MPDU):

- NT8D56AA single-breaker MPDU for the NT8D29 CE Power Supply AC
- NT8D56AC single-breaker MPDU for the NT7D14 CE/PE Power Supply AC
- NT8D57 dual-breaker MPDU for the NT8D06 PE Power Supply AC and NT8D21 Ringing Generator AC

⚠ **Danger:**

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Removing the MPDU

1. Remove the rear grill on the column pedestal.

   Set the main circuit breaker to OFF (down).

   ⚠ **Caution:**

   Service Interruption

   Shutting off the main circuit breaker disables the entire column.

2. Remove the I/O safety panel over the backplane.
3. Tag and disconnect the power plugs to the MPDU.
4. Remove the metal plate covering the MPDU in the front of the module by removing the mounting screw in each corner.
5. Unhook the locking devices on the power supply next to the MPDU.

   Pull the power supply out of the card cage.

6. Remove the mounting screws for the MPDU; the screw-heads are in the wall of the power supply slot.

   See Figure 50: Mounting screws for the MPDU on page 269.

   Be careful—do not let the screws fall into the module below.

   Lift the unit out of the module.

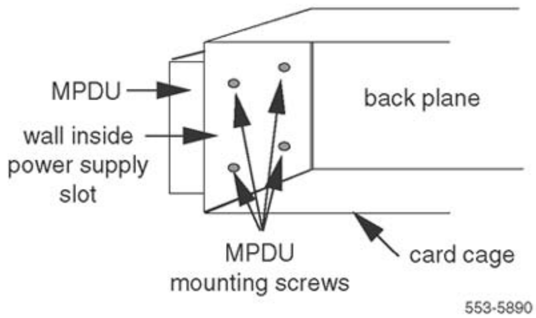

Figure 50: Mounting screws for the MPDU

Installing the replacement MPDU

1. Set the circuit breaker(s) on the replacement MPDU to OFF (down).
2. Position the replacement MPDU in the module.

   Install the mounting screws through the wall of the power supply slot.
3. Reinsert the power supply and hook the locking devices.
4. Position the metal plate in front of the MPDU and install the mounting screw in each corner.
5. Connect the power plugs to the rear of the MPDU.
6. Position the I/O safety panel.

   Tighten the screws.
7. Set the circuit breaker(s) on the replacement MPDU to ON (up).
8. Reset the main circuit breaker in the column pedestal to ON (up) and replace the pedestal grill.
9. Tag defective equipment with a description of the problem and package it for return to a repair center.

NT8D3503/NT8D3507 Network Module Card Cage

The NT8D3503 Network Module Card Cage uses Bus Terminating Units (BTUs).

The NT8D3507 Network Module Card Cage does not use BTUs; it uses hybrid terminators that are an integral part of the backplane. To replace a defective backplane in an NT8D35 Network Module, it is necessary to replace the card cage.

This section describes how to replace the Network Module Card Cage.

Danger:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

On the back of each Network module backplane are five connectors: A, B, C, D and E. The connectors from shelf 0 of each Network group 1 through 7 must be connected to the connectors in shelf 1 of the same Network group. In North American systems, these connections are made in the factory. In shipments outside North America, the Network shelves are shipped separately. These connections must be made in the field

Connect groups 1 through 7: shelf 0 to shelf 1

This connection is NOT made for Network group 0 in the Core/Net modules.

1. Connect an NT8D99AB cable from the A connector in shelf 0 of Network group 1 to the A connector in shelf 1 Network group 1.
2. Connect the B connector in shelf 0 to the B connector in shelf 1.
3. Connect the C connector in shelf 0 to the C connector in shelf 1.
4. Connect the D connector in shelf 0 to the D connector in shelf 1.
5. Connect the E connector in shelf 0 to the E connector in shelf 1.
6. Connect the A, B, C, D, and E connectors between shelf 0 and shelf 1 for all other Network groups in the system (except group 0)

Note:

All connections are made with an NT8D99AB cable.

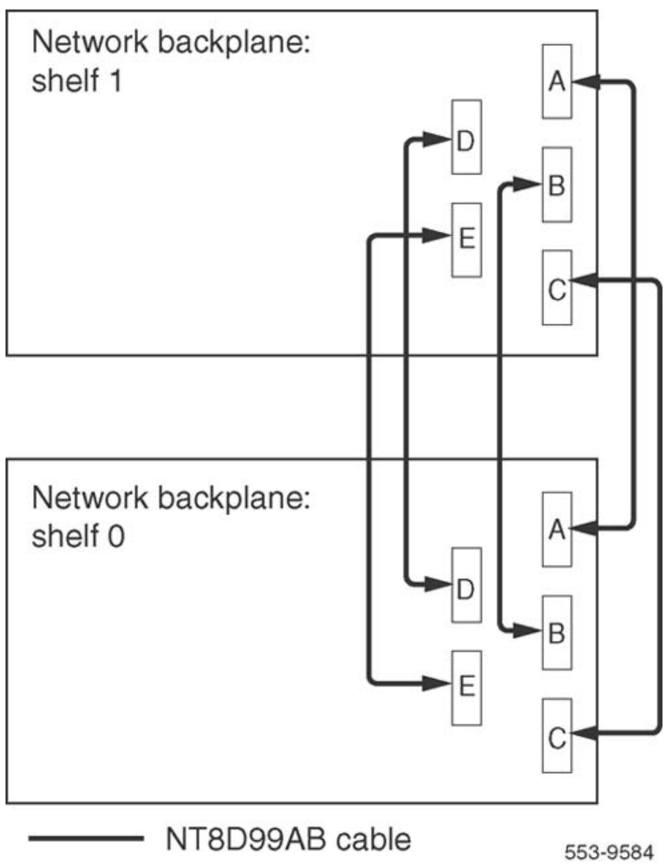

Figure 51: Network shelf 0 to shelf 1 backplane connections (groups 1 through 7)

Connect the Network modules to the Core/Net modules

Each Network shelf contains one 3PE card. These 3PE cards are connected to the Termination Panel in the back of the Core/Net shelves.

The following three figures show the location of the Termination Panel and 3PE cables on the Core/Net backplane.

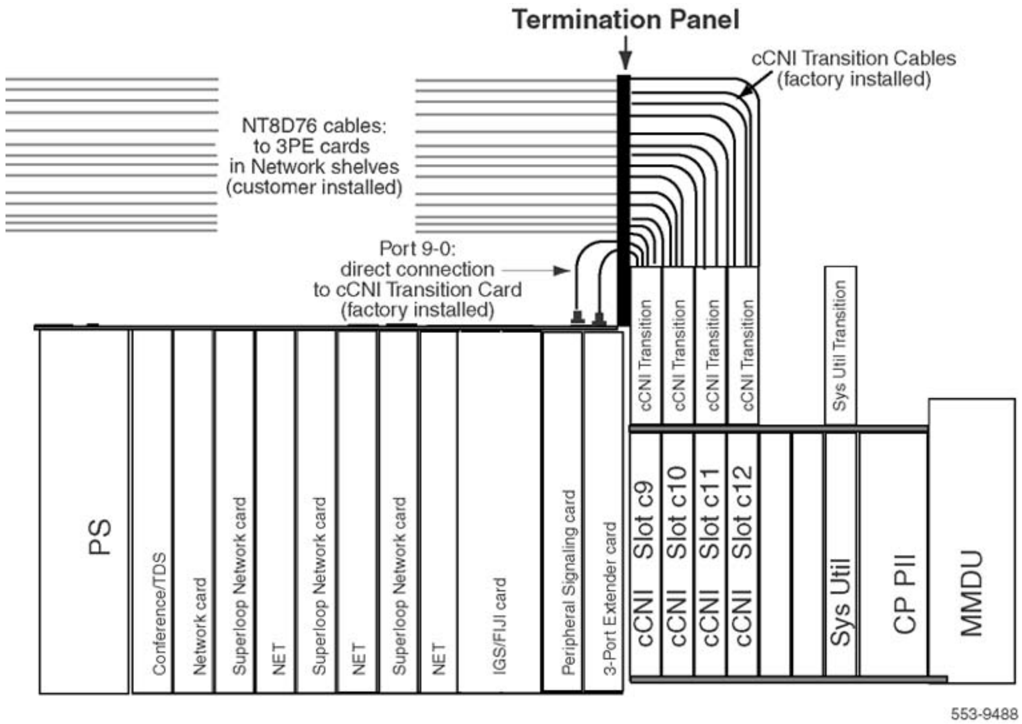

Figure 52: 3PE Termination Panel in the Core/Net module (top view)

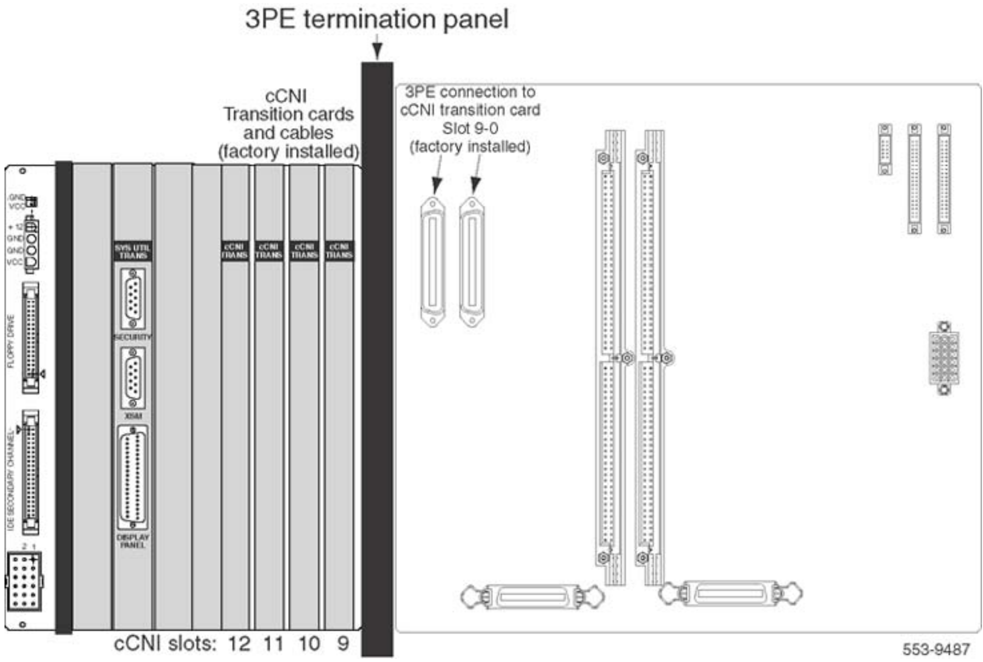

Figure 53: Core/Net backplane (rear view)

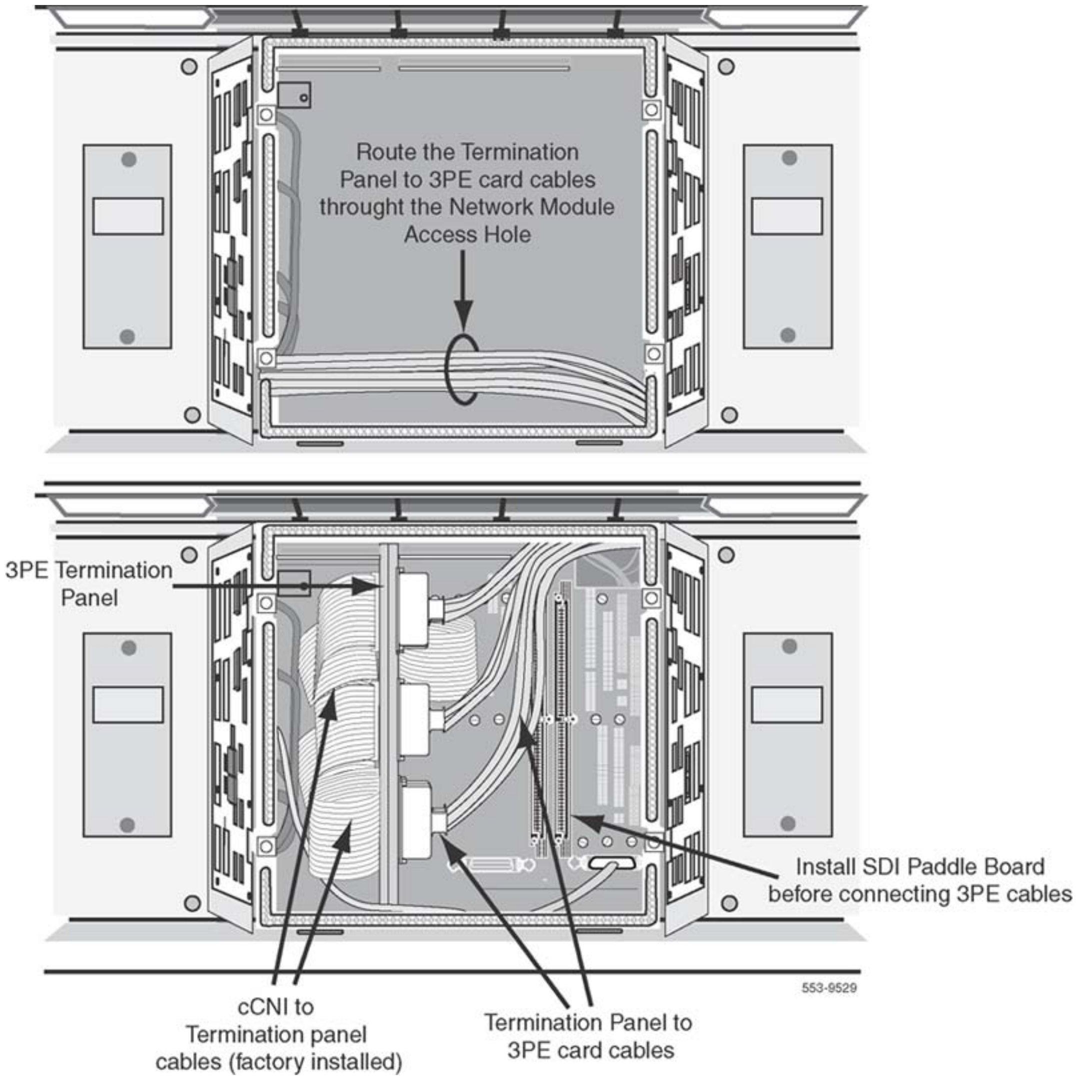

Figure 54: 3PE Termination Panel (rear module view)

cCNI slot and port assignments

Each system contains a minimum of one and a maximum of four CNI cards. Each cCNI card contains two ports to support up to two Network groups.

cCNI cards are identified by slot and port. Each port is assigned in software to a specific Network group. Use the System Layout Plan to determine the connections for the system.

- Each 3PE card has two faceplate connections: J3 and J4. Two cables are used for each card.
- 3PE cards in Network shelves "0" are connected to the 3PE Termination Panel in Core/Net 0.
- 3PE cards in Network shelves "1" are connected to the 3PE Termination Panel in Core/Net 1.

Table 40: cCNI Network group designations on page 274 specifies the default Network group assignments for each cCNI slot and port. These designations can be changed in software if necessary.

Table 40: cCNI Network group designations

cCNI card slot	cCNI card port	3PE Termination Panel label	Connected to Network group
c9	0	N/A (factory installed directly to the Core/Net backplane)	0
c9	1	Port 9-1	1
c10	0	Port 10-0	2
c10	1	Port 10-1	3
c11	0	Port 11-0	4
c11	1	Port 11-1	5
c12	0	Port 12-0	6
c12	1	Port 12-1	7

cCNI to 3PE Termination Panel cable connections

The cCNI slot and port connections are labeled on the 3PE Termination Panel. See Figure 55: 3PE Termination Panel (Core/Net module) on page 275. Each 3PE card is connected with two cables: one to J3 and one to J4. Table 40: cCNI Network group designations on page 274 specifies the Network group that connects to each slot.

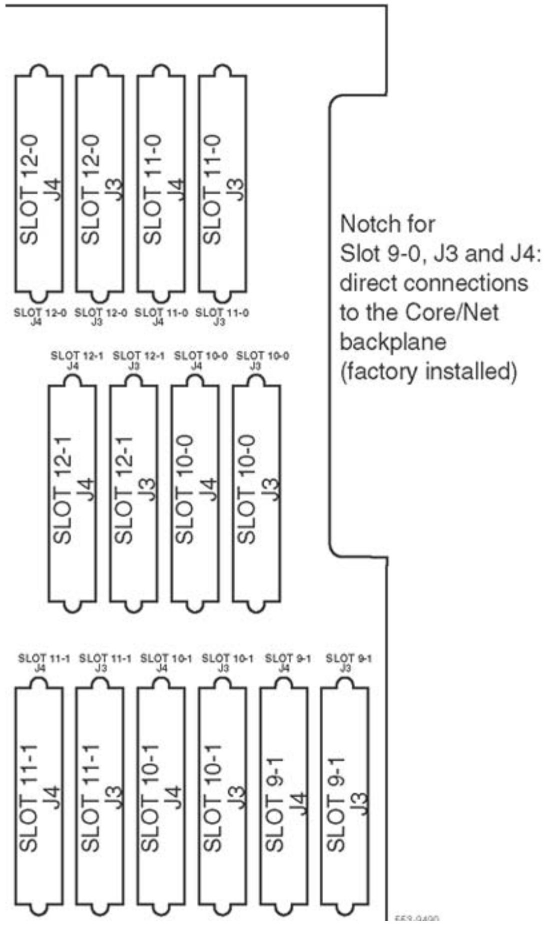

Figure 55: 3PE Termination Panel (Core/Net module)

Connect the 3PE cables to the 3PE Termination Panels

Two NT8D76 cables connect from J3 and J4 of each 3PE faceplate to the 3PE Termination Panel. See Figure 56: Example of 3PE faceplate to 3PE Termination Panel connection on page 277.

Refer to Table 40: cCNI Network group designations on page 274 for cCNI port and slot assignments. Connect shelf 0 3PE cards to the Core/Net 0 panel; connect shelf 1 3PE cards to the Core/Net 1 panel. The 3PE cables for Network group 0 are factory installed.

Connect the Network shelf 0 3PE cards to Core/Net 0

1. Connect a NT8D76 cable of the appropriate length from J3 on the 3PE card faceplate in Network group 1, shelf 0 to the Port 9-1, J3 connection on the 3PE Termination Panel in Core/Net 0.
2. Connect a NT8D76 cable of the appropriate length from J4 on the 3PE card faceplate in Network group 1, shelf 0 to the Port 9-1, J4 connection on the 3PE Termination Panel in Core/Net 0.
3. Connect a NT8D76 cable of the appropriate length from J3 on the 3PE card faceplate in Network group 2, shelf 0 to the Port 10-0, J3 connection on the 3PE Termination Panel in Core/Net 0.
4. Connect a NT8D76 cable of the appropriate length from J4 on the 3PE card faceplate in Network group 2, shelf 0 to the Port 10-0, J4 connection on the 3PE Termination Panel in Core/Net 0.
5. Install the remaining cables, according to the assignments in Table 40: cCNI Network group designations on page 274.

Connect the Network shelf 1 3PE cards to Core/Net 1

1. Connect a NT8D76 cable of the appropriate length from J3 on the 3PE card faceplate in Network group 1, shelf 1 to the Port 9-1, J3 connection on the 3PE Termination Panel in Core/Net 1.
2. Connect a NT8D76 cable of the appropriate length from J4 on the 3PE card faceplate in Network group 1, shelf 1 to the Port 9-1, J4 connection on the 3PE Termination Panel in Core/Net 1.
3. Connect a NT8D76 cable of the appropriate length from J3 on the 3PE card faceplate in Network group 2, shelf 1 to the Port 10-0, J3 connection on the 3PE Termination Panel in Core/Net 1.
4. Connect a NT8D76 cable of the appropriate length from J4 on the 3PE card faceplate in Network group 2, shelf 1 to the Port 10-0, J4 connection on the 3PE Termination Panel in Core/Net 1.
5. Install the remaining cables according to the assignments in Table 40: cCNI Network group designations on page 274

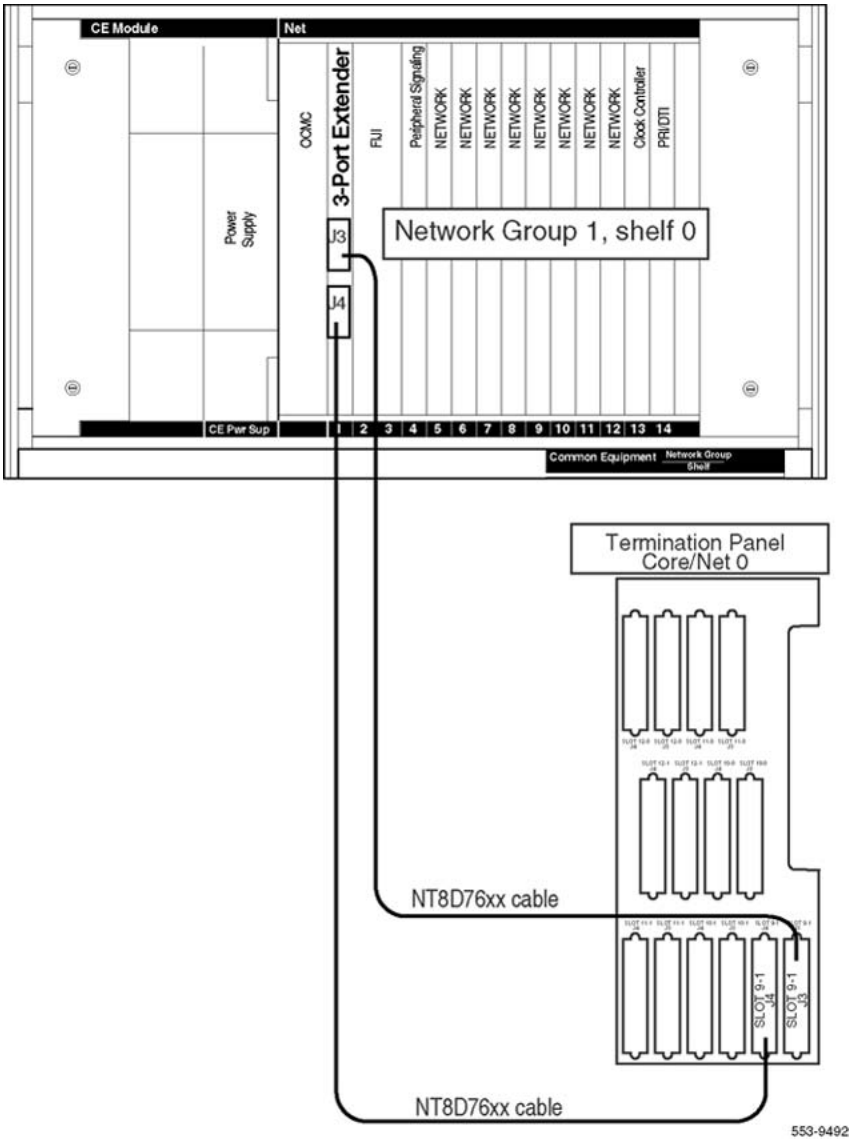

Figure 56: Example of 3PE faceplate to 3PE Termination Panel connection

NT8D3703 IPE Module Card Cage

To replace a defective backplane in an NT8D37 IPE Module, it is necessary to replace the card cage. This section describes how to replace the IPE Module card cage.

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

Danger:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Removing the IPE Module card cage

1. Software-disable the controller card (and all cards connected to the controller):

   `LD 32`

   `DSXP x` "x" is the controller card number

2. Turn off power to the column or the module power supply and ringing generator (if equipped):

   - With AC power, set the main circuit breaker for the column to OFF (down) in the rear of the pedestal.

     Voltage:

     DANGER OF ELECTRIC SHOCK

     Due to hazardous voltage in AC-powered systems, power to the entire column must be shut down. This shuts down all functions in the column.

   - With DC power, set the switch on the NT6D40 PE Power Supply and NT6D42 Ringing Generator to OFF (down). Set the circuit breaker for just this module to OFF (down) in the rear of the pedestal. (All other modules in the column retain power.)

3. Remove the NT8D22 System Monitor in the rear of the pedestal.

   Do not turn off the blower unit in the front of the pedestal.

   Note:

   If this is the master system monitor, disconnect the RJ11 cables before pulling the system monitor out of the pedestal.

   Caution:

   Service Interruption

   If the system monitor is not removed, the system may shut down.

4. Remove all cards from the module:

   a. Tag and disconnect cables to all faceplate connectors.

   b. Tag cards so they can be returned to the same slot. Remove cards.

5. Disconnect cables, plugs, and wires from the rear of the module to the backplane:

   a. Remove the I/O safety panel by turning the screws on each side.

      Set the cover aside.

   b. Tag and disconnect all cables from the backplane to the interior of the I/O assembly.
   c. Tag and disconnect all plugs, wires, and cables to the backplane.
6. Remove the two mounting screws that secure the rear of the card cage to the module.
7. Remove the front cover plates on both sides of the card cage.
8. Remove the three mounting screws that secure the front of the card cage to the bottom of the module. Pull the card cage out of the module.

Installing the replacement IP Module card cage

1. Slide the replacement card cage into position in the module.

   Install the mounting screws at the front of the card cage.
2. Replace the front cover plates on both sides of the card cage.
3. Install the mounting screws at the rear of the card cage.
4. Reconnect cables, plugs, and wires from the rear of the module to the backplane:
   a. Connect all cables from the interior of the I/O assembly to the backplane.
   b. Connect all plugs, wires, and cables to the backplane.
   c. Position the I/O safety panel. Tighten the screws.
5. Return cards to their slots.

   Reconnect all cables to faceplate connectors.
6. Reinstall the system monitor.

   If this is the master system monitor, reconnect the RJ11 cables after it is installed.
7. Turn on power to the column or the module power supply and ringing generator:
   - With AC power, set the main circuit breaker in the pedestal to ON (up).
   - With DC power, set the breaker to ON (up) in the pedestal. Set the switch to ON (up) on the power supply and the ringing generator in the module.
8. Software-enable and test the controller card (and all cards connected to the controller):

ENXP x	"x" is the controller card number
****	Exit LD 32

9. Test the shelf by testing each loop:

```
LD 30
SHLF l s
```
"l s" are the loop and shelf numbers

- If there is a problem, an NWS system message is generated.
- If there is no problem, exit LD 30:

```
****
```

10. Tag defective equipment with a description of the problem and package it for return to a repair center.

NT9D19 68040 Call Processor (CP) Card replacement in systems equipped with NT5D61 IODU/C cards

This section describes how to replace an NT9D19 68040 Call Processor (CP) card in systems equipped with NT5D61 IODU/C cards.

Note:

This procedure may also be used to replace a 64 MB NT9D19 CP card with a 96 MB NT9D19 CP card.

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpretation of system messages.

⚠ **Danger:**

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

⚠ **Caution:**

Service Interruption

At some point in this procedure, it is necessary to warm-start the system, causing a momentary interruption in call processing.

Removing the CP card

1. To access the Core during the replacement procedure, connect a terminal to the J25 port on the I/O panel in the Core Module or Core/Network Module for the CP card being replaced.

   To communicate with the processor, use the following settings on the terminal:

   - 9600 baud

- 7 data
- space parity
- 1 stop bit
- full duplex
- XOFF

If using only one terminal or a switch box, switch the connection from Core to Core as needed.

2. The CP card being replaced must be in the inactive Core.

   Check the status of the NT9D19 Call Processor cards:

`LD 135`	
`STAT CPU`	Determine which CP card is active
If necessary, switch Cores:	
`SCPU`	Switch Cores
`****`	Exit LD 135

3. Set the NORM/MAINT switch on the NT9D19 Call Processor card to MAINT on the active Core.
4. Set the ENB/DIS switch on all CNI cards on the inactive Core to DIS.
5. Perform the following three steps on the inactive Core in an uninterrupted sequence:
   a. Press and hold down the MAN RST button on the CP card on the inactive Core.
   b. Set the NORM/MAINT switch to MAINT.
   c. Release the MAN RST button.

   The system is now in split mode where each Core is functioning independently and the automatic switchover has been disabled.

Installing the replacement CP card

1. Set the NORM/MAINT switch to MAINT on the replacement card.
2. Insert the Install Program diskette which corresponds with the NT9D19 (68040) Call Processor card.
3. Remove the current CP card and put it in a static bag and box.
4. Insert the CP replacement card into its vacated slot and hook the locking devices.
5. Press the MAN RST button on the replacement CP card.
6. At the Main Menu select <u> to go to the Install Menu.

```
                    M A I N  M E N U

         The Software Installation Tool will install or upgrade Meridian-1
         System Software, Database and the PE-ROM (both CP and IOP ROM).
         You will be prompted throughout the installation and given the
         opportunity to quit at any time.

         Please enter:
<CR>-->  <u> - To Install menu.
         <t> - To Tools menu.
         <q> - Quit.

         Enter choice > u
```

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- Insert the Keycode diskette when prompted and select <a> to continue with the keycode validation.

```
         Please insert the diskette with the keycode file into the floppy
         drive.

         Please enter:
<CR>-->  <a> - Continue with the keycode validation
            (the keycode diskette is in the floppy drive).
         <q> - Quit.

         Enter Choice > a
```

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7. Select the following options in sequence from the Install Menu:

<g>	to reinstall CP software
<y>	to start installation
<y>	to continue installation
<a>	to continue with ROM upgrade
<cr>	to return to the Install Menu

8. At the Install Menu, select the following options in sequence

<e>	to install CP-BOOTROM
<y>	to start installation
<y>	to continue installation
<a>	to continue with ROM upgrade
<cr>	to return to the Install Menu

9. Remove the diskette from the slot.
10. Select the following options to quit:

<q>	to quit

<y>	to confirm quit
<a>	to reboot the system.

Note:

The system reboots. Wait for the "INI" and "DONE" messages to appear before continuing. It takes at least 70 seconds between the "DONE" and "INI" messages.

After the system initialization has finished (INI messages are no longer displayed on the system terminal), check for dial tone on a telephone.

11. Following a successful dial tone test, perform the following basic sanity tests:
    a. Make sure calls can be placed.
    b. Check for error messages, line noise, chatter, or other problems. Track sources and resolve problems as necessary.
12. Place the system back in the redundant (normal) mode with automatic switchover capability.

    Perform the following five steps in uninterrupted sequence on the inactive Core (the Core with the replaced CP card):

    a. Press and hold down the MAN RST button on the CP card of the inactive Core.
    b. While holding down the MAN RST button, set the NORM/MAINT switch on the same CP card to NORM.
    c. Enable all CNI switches in the inactive Core.
    d. Release the MAN RST button.
    e. Set the CP card in the active Core to NORM.

    After several minutes, an "HWI533" message is issued by the active Core indicating that the inactive Core memory is being synchronized with the active Core memory.
13. Log on to the system through the terminal and check the status of the replacement CP card from the active side:

`LD 135`	Load LD 135
`STAT CPU`	Obtain the CPU status

14. If there are CCED messages generated by the STAT CPU command on the replacement CP card, set the NORM/MAINT switch to MAINT,

    Press the reload (MAN RST) button, and set the NORM/MAINT switch back to NORM. (It may take 2 to 4 minutes for memory synchronization to take place.)

    After the HWI0533 message is displayed, test the replacement CP card from the active CPU:

`TEST CPU`	The test causes a cold start on the inactive CPU

If the test results in:

`CCED014`	"Test failed because unable to enter SPLIT mode"

On the active CP card set the NORM/MAINT switch to NORM, and from the active side enter:

`TEST CPU`	Test the CP card

15. Set the NORM/MAINT switch to NORM on the active CP card (if not already set).
16. Check the status of the CPUs:

    `STAT CPU`
17. Test the CPU.

    `TEST CPU`
18. Check the status of the CNIs:

    `STAT CNI`
19. Switch Cores and exit the program:

`SCPU`	
`****`	Exit LD 135

NTAG26 Extended Multifrequency receiver

This section describes how to replace a defective NTAG26 Multifrequency Receiver Card (XMFR) in the IPE module.

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

Danger:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Caution:

Service Interruption

Service is interrupted when a loop is disabled.

Removing the XMFR card

1. software-disable the XMFR by entering

`LD 32 DISS l s`

("l s" represents loop and shelf number)

2. Unhook the locking devices on the card and pull the card out of the card cage.

Installing the replacement XMFR card

1. Insert the replacement card into the vacated slot and hook the locking devices.
2. software-enable the loop on the card by entering

   `ENLS l s`
3. End the session in LD 32 by entering

   `****`
4. Test the loop on the card by entering

   `LD 30 LOOP l`

   If there is a problem, an NWS system message is displayed and the appropriate red LED is lit on the faceplate of the card.
5. End the session in LD 30 by entering

   `****`
6. Tag defective equipment with a description of the problem and package it for return to a repair center.

NTBK51AA/NTBK51CA Downloadable D-Channel Daughterboard

This section describes how to replace the Downloadable D-Channel Daughterboard (DDCH).

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

⚠ **Danger:**

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

⚠ Electrostatic alert:

CAUTION WITH ESDS DEVICES

The antistatic wrist strap located inside the cabinet must be worn before handling circuit cards. Failure to wear the wrist strap can result in damage to the circuit cards.

The DDCH can only be removed when it is disabled in software.

Removing the DDCH

Both ports of the associated DDP circuit card must be disabled.

1. Disable the faceplate switch on the DDP.
2. Remove the DDP and DDCH.

Note:

Test procedures require a 24-hour minimum of bit error-rate testing before being used. Refer to *Avaya ISDN Primary Rate Interface Maintenance (NN43001-717)* for these procedures.

Note:

Dual DTI/PRI loops must be configured in software before defining DCH links.

To set the address for the DDCH, see Table 41: DCH mode and address select switch settings on page 286.

The DDCH can be mounted on any DDP card. If a DDCH is present on a DDP card, then an external D-Channel should not be connected to JC. If a DDCH is present, the LED "DCH" is lit.

Table 41: DCH mode and address select switch settings

Switch	Description	S3 switch setting
1-4	D-Channel Daughterboard Address	See Table 42: DDCH daughterboard address select switch settings on page 287 on Table 42: DDCH daughterboard address select switch settings on page 287.
5-7	For future use	off
8	External DCH or Onboard DDCH	off - MSDL or DCHI card on - Onboard DDCH Daughterboard

Installing the replacement DDCH

1. Unpack and inspect the DDCH daughterboard.
2. Push the four stand-offs on the DDCH daughterboard into the four corresponding mounting holes on the DDP.

   The DDCH daughterboard mounts to mate correctly with P2 and P3 on the DDP motherboard.

Table 42: DDCH daughterboard address select switch settings

Device Addr.[1]	Switch Setting			
0[2]	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF
2	OFF	ON	OFF	OFF
3	ON	ON	OFF	OFF
4	OFF	OFF	ON	OFF
5	ON	OFF	ON	OFF
6	OFF	ON	ON	OFF
7	ON	ON	ON	OFF
8	OFF	OFF	OFF	ON
9	ON	OFF	OFF	ON
10	OFF	ON	OFF	ON
11	ON	ON	OFF	ON
12	OFF	OFF	ON	ON
13	ON	OFF	ON	ON
14	OFF	ON	ON	ON
15	ON	ON	ON	ON

Note:

The maximum number of DCHI, MSDL, and DDCH devices in the system is 16. The Device Addresses are equivalent to the MSDL DNUM designations. For programming information about the MSDL, refer to *Avaya Circuit Card Reference (NN43001-311)* and *Avaya Software Input Output Maintenance (NN43001-711)*.

Note:

Device address 0 is commonly assigned to the System Monitor.

Double slot (NTRB33AF) FIJI Card replacement

When removing a FIJI card, disable the ring and set the Faceplate switch to disable before removing the FIJI card.

Removing the FIJI card

1. Verify the status of the system clocks.

`LD 60`	
`SSCK`	Get status of system clock (x=0 or 1)

2. Switch system clocks, if it is necessary, to ensure that the inactive clock is associated with the ring that includes the target FIJI card to be replaced.

`LD 60`	
`SSCK`	Switch system clock from active to standby.
`****Exit`	

3. Obtain the status of both rings.

`LD 39`	
`STAT RiNG x`	Obtain status of ring (x=0 or 1). Normal response is Half/Half
`****Exit`	

4. Query the alarm condition for all FIJI cards.

`LD 39`	
`STAT ALRM x y FULL`	Query status of all alarms (active and inactive) for FIJI card in group x, side y.
`****Exit`	

5. Disable auto-recovery.

`LD 39`	
`ARCV OFF`	Disable auto-recovery operation for ring.

6. Switch call processing to ring with active clock.

`LD 39`	
`SWRG y`	Switch call processing to ring (y = 0 or 1).

7. Obtain the status of both rings.

`LD 39`	
`STAT RING x`	Get status of ring on side x (x = 0 or 1).

8. Disable the idle ring.

`LD 39`

`DIS RING x`	Disable all FIJI cards on ring (x = 0 or 1).

9. Confirm the ring is disabled.

`LD 39`

`STAT RING x`	Disable all FIJI cards on ring (x = 0 or 1).

10. Set the ENB/DIS switch to DIS on the target FIJI card.

⚠ **Caution:**

Service Interruption

To avoid interrupting service, set ENB/DIS switches to DIS before disconnecting or connecting cables.

11. Tag and disconnect cables to the card being removed.
12. Unhook the locking devices on the card.
13. Pull the card out of the card cage.

Follow the steps in Installing the FIJI card on page 289 to install the FIJI card.

Installing the FIJI card

1. Set the ENB/DIS switch to DIS on the replacement FIJI card.
2. Insert the replacement FIJI card into the vacated slot.
3. Hook the locking devices.
4. Connect cables to the replacement FIJI card.
5. Set the ENB/DIS switch to ENB on the replacement FIJI card.

Note:

Wait until the FIJI card finishes the Self Test before proceeding. When the display indicates the Group and Shelf where the FIJI card is located, the self test is completed.

6. software-enable the ring.

`LD 39`

`ENL RING x`	Enable all FIJI cards on ring (x = 0 or 1).

7. Confirm the ring is enabled.

`LD 39`	
`STAT RING x`	Get status of ring on side x (x = 0 or 1).

8. Test the replacement FIJI card.

`TEST 360 x y z`	Perform 360 test on FIJI card group (x = group 0 to 7, y = side 0 or 1, z = time in 2 second intervals. Repeat this test on the next FIJI card in the ring for a complete test.

9. Reset the threshold for switchover functionality.

`LD 39`	
`RESET`	Reset the threshold for switchover functionality.

10. Restore the ring.

`LD 39`	
`RSTR`	Restore ring.

11. Enable auto-recovery.

`LD 39`	
`ARCV ON`	Enable auto-recovery operation for ring.

12. Confirm ring is enabled and in Half/Half state.

`LD 39`	
`STAT RING x`	Get status of ring (x = 0 or 1).
`****Exit`	

13. Verify status of system clocks.

`LD 60`	
`SSCK x`	Get status of system clock, where x = 0 or 1.
`****Exit`	

Single Slot (NTRB33BBE5) FIJI Card replacement

The following procedure explains the steps necessary to replace an existing double-slot NTRB33Ax FIJI pack with the new single-slot NTRB33BBE5 FIJI. The NTRB33BBE5 completely replaces the existing FIJI functionality and provides new features and design enhancements.

1. Check and confirm that clock status is good.

`LD 60`	
`SSCK x`	Get status of system clock, where x = 0 or 1.
`****Exit`	

   The clock controllers must be enabled with no errors and locked to the primary or secondary reference.

2. Check and confirm the two rings are in stable condition.

`LD 39`	
`STAT RING x`	Get status of ring on side x (x = 0 or 1).
`****Exit`	

   Traffic must be running in Half-Half mode on the two rings.

3. Check for any alarms on the two rings.

`LD 39`	
`STAT ALARM x`	Get status of alarm on side x (x = 0 or 1, either ring).
`****Exit`	

4. Check and confirm all FIJI cards and rings are operating normally.

`LD 39`	
`TEST ALL`	Get status of cards and rings.
`****Exit`	

   FIJI080/FIJI081 error messages can be displayed indicating 360 test failures on Network loops where DPRI NT5D12xx packs are installed with card versions of less than AG. This is a known issue with these versions of Dual PRI packs as they interfere with the timeslots used by the 360 tests of FIJI.

5. Disable the auto-recovery for the rings.

`LD 39`	
`ARCV OFF`	Disable auto-recovery for rings.
`****Exit`	

6. Check to see which clock is active. If necessary, align system clocks to ensure the active clock is associated with the active ring so that the FIJI cards on the inactive ring can be replaced. The following commands provides the status of both clock controllers. The ring that has its clock controller indicating active is the active ring.

`LD 60`	
`SSCK x`	Get status of clock on ring x (x = 0 or 1). Execute command for each ring.
`****Exit`	

7. Switch Traffic to the Active ring (as determined in previous step).

`LD 39`	
`SWRG <active side>`	Where <active side> = 0 or 1, either ring.
`****Exit`	

8. Disable the Inactive ring.

`LD 39`	
`DIS RING <inactive side>`	Where <inactive side> = 0 or 1, either ring.
`****Exit`	

9. Remove each of the installed FIJI packs from the disabled "inactive" ring in sequence, and replace them with the new FIJI pack.

Note:

The new NTRB33BBE5 FIJI pack is a single slot module and its location in the CORENET or NETWORK Shelf must be as specified below:

CORENET	Install new FIJI (NTRB33BBE5) in Slot 9 (nine)
NETWORK SHELF	Install new FIJI (NTRB33BBE5) in Slot 2 (two)

10. When installation is completed, enable the Inactive ring.

`LD 39`	
`ENL RING <inactive side>`	Where <inactive side> = 0 or 1, either ring.
`****Exit`	

11. Switch traffic to enabled ring from previous step.

`LD 39`	
`SWRG <inactive side>`	Where <inactive side> = 0 or 1, either ring.
`****Exit`	

12. Switch the clock to the enabled ring.

```
LD 60

SWCK

****Exit
```

There can be a temporary FIJI or XNET PLL Unlock Error message during the clock switch as the rings could dissimilar (old and new) FIJI packs on either ring.

13. Disable the "newly" inactive ring.

`LD 39`	
`DIS RING <inactive side>`	Where <inactive side> = 0 or 1, either ring.
`****Exit`	

14. Remove each of the installed FIJI packs from the disabled "inactive" ring in sequence, and replace them with the new FIJI pack.

Note:

The new NTRB33BBE5 FIJI pack is a single slot module and its location in the CORENET or NETWORK Shelf must be as specified below:

CORENET	Install new FIJI (NTRB33BBE5) in Slot 9 (nine)
NETWORK SHELF	Install new FIJI (NTRB33BBE5) in Slot 2 (two)

15. When installation is completed, enable the Inactive ring.

`LD 39`	
`ENL RING <inactive side>`	Where <inactive side> = 0 or 1, either ring.
`****Exit`	

16. Restore Traffic to HALF-HALF mode

```
LD 39
```

```
RSTR
****Exit
```

Traffic should now be running in HALF-HALF mode on the two rings without any FIJI alarms.

17. Turn Auto-recovery of rings ON.

```
LD 39
ARCV ON
****Exit
```

18. Check for any alarms on the two rings.

```
LD 39
STAT ALARM x
****Exit
```

`STAT ALARM x`	Get status of alarm on side x (x = 0 or 1, either ring).

19. Check and confirm clock status is good.

```
LD 60
SSCK x
****Exit
```

`SSCK x`	Get status of clock on side x (x = 0 or 1, either ring).

Clock controllers should be enabled with no errors and locked to the primary or secondary reference.

20. Execute full diagnostic tests

```
LD 39
TEST ALL
****Exit
```

There should be no FIJI error messages.

Note:

FIJI080/FIJI081 error messages can be displayed indicating 360 test failures on Network Loops where DPRI NT5D12xx packs are installed with vintages less than AH. This is a known issue with these vintages of Dual PRI packs as they interfere with the timeslots used by the 360 tests of FIJI.

21. Execute the Clock switch at least 10 times once every minute.

```
LD 39

SCLK

****Exit
```

There should be no FIJI or XNET PLL Unlock Error messages.

P0699798 Air Filter

This section describes how to replace the air filter in the pedestal.

Replacing the air filter

It is not necessary to power down the system to perform this procedure.

1. Remove the pedestal front grill and set it aside. The air filter is directly above the blower unit in a slot in the pedestal.

   See Figure 57: Blower unit and air filter in the front of the pedestal on page 295.

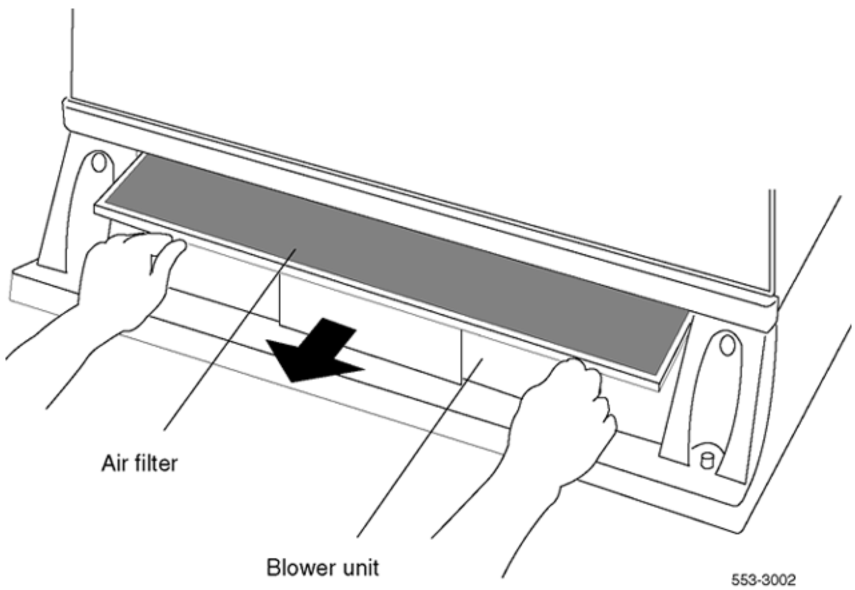

Figure 57: Blower unit and air filter in the front of the pedestal

2. Grasp the plastic tabs on the front of the air filter. Pull the filter out of the pedestal.
3. To install a clean, dry air filter:
   a. Make sure the plastic tabs are on the front of the filter.

      See Figure 58: Pull-tab locations on the air filter on page 296.

   b. Gently push the filter into the pedestal slot until it seats fully in the back.

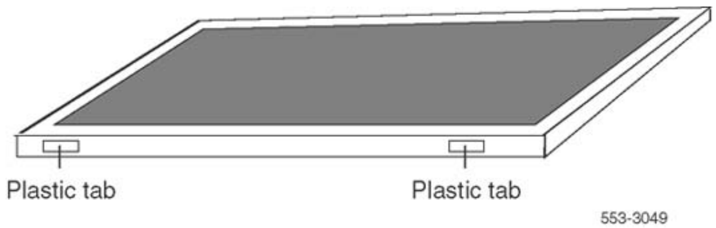

Figure 58: Pull-tab locations on the air filter

4. To reinstall the pedestal grill:
    a. Fit the bottom of the grill into the holes on the bottom edge of the pedestal.
    b. Push the grill into a locked position against the pedestal.
    c. If there are captive screws on the grill, tighten the screws.

QPC43 Peripheral Signaling Card

Use this procedure to replace a peripheral signaling card.

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

Danger:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Caution:

Service Interruption

Disabling or removing a peripheral signaling card from a network shelf disables all loops on that shelf.

Removing the Peripheral Signaling card

1. Check the status of the peripheral signaling card:

`LD 32`	
`STAT PER x`	Table 43: Peripheral signaling card numbers on page 297 lists peripheral signaling card numbers specified by "x"

    a. If the response is DSBL, go to step 2 on page 297.

    b. If the response is ENBL, enter **DSPS x** to disable the card and go to step 2 on page 297.

2. Set the ENB/DIS switch to DIS.
3. Unhook the locking devices on the card and pull the card out of the card cage.

Installing the replacement Peripheral Signaling card

1. Set the ENB/DIS switch to DIS on the replacement card.
2. Set the jumper plug on the replacement card with the same configuration as on the card that was removed.

   If there is a vintage change, be sure to check *Avaya Circuit Card Reference (NN43001-311)* for any differences.
3. Insert the replacement card into the vacated slot and hook the locking devices.
4. Set the ENB/DIS switch to ENB on the replacement card.
5. software-enable the card and loops serviced by the card:

   `ENPS x`

    a. When the process is complete, a system response. is displayed

    b. If there is a problem, an NPR system message is generated and the red LED is lit on the faceplate of the card.

    c. If there is no problem, exit LD 32:

    `****`

6. Test each loop serviced by the Peripheral Signaling card:

`LD 30`	
`LOOP loop`	"loop" is a loop number (see Table 43: Peripheral signaling card numbers on page 297)
`****`	Exit LD 30

7. Tag defective equipment with a description of the problem and package it for return to a repair center.

Table 43: Peripheral signaling card numbers

Group/ shelf	Peripheral signaling card	Loops disabled/enabled		
0 / 0 0 / 1 1 / 0 1 / 1 2 / 0 2 / 1 3 / 0 3 / 1 4 / 0 4 / 1 5 / 0 5 / 1 6 / 0 6 / 1 7 / 0 7 / 1	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	0 16 32 48 64 80 96 112 128 144 160 176 192 208 224 240	–––– –––– –––– ––––	15 31 47 63 79 95 111 127 143 159 175 191 207 223 239 255

QPC441 Three-Port Extender Card

This section describes how to replace a three-port extender (3PE) card. To software-disable the 3PE card:

- disable the associated NT6D65 Core to Network Interface (CNI) Card. Go to step 1 on page 298.

Note:

In any Network Module, before hardware-disabling the 3PE card, software-disable the QPC43 Peripheral Signaling Card, the QPC412 Intergroup Switch (IGS) Card, and any SDI cards in the card cage.

Note:

If replacing the 3PE card in the Core/Network, before hardware-disabling the 3PE card, software-disable the QPC471 or QPC775 Clock Controller Card on the same CPU. Make sure the replacement card is QPC441 vintage F or later.

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

Danger:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Caution:

Service Interruption

At some point in this procedure the system may initialize, causing a momentary interruption in call processing.

Removing the 3PE card

1. software-disable the 3PE. The CPU associated with the CNI card must be inactive:

   Check the status of all configured CNI cards and the network group number of both ports on each CNI card:

   `STAT CNI`

2. The CPU associated with the CNI card must become inactive. To switch CPUs:

   `LD 135 SCPU`

3. Disable the CNI port associated with the 3PE card:

`DIS CNI c s p`	c = CPU (0 or 1) s = card slot (8–12) p = port (0 or 1)
`****`	Exit LD 135

4. If the 3PE card is in the Core/Network Module, disable the clock controller card in that module.

   Check the status of the clock:

`LD 60`	
`SSCK x`	"x" is the CPU (0 or 1)

5. If the clock is active, switch the clock to make it inactive:

   `SWCK`

6. Disable the clock:

`DIS CC x`	
`****`	Exit LD 60

   Go to step 10 on page 300.

7. software-disable the associated peripheral signaling card:

`LD 32`	
`DSPS x`	Table 44: Peripheral signaling card numbers on page 299 lists peripheral signaling card numbers specified by "x"
`****`	Exit LD 32

Table 44: Peripheral signaling card numbers

Group/ shelf	Peripheral signaling card	Loops disabled/enabled		
0 / 0 0 / 1 1 / 0 1 / 1 2 / 0 2 / 1 3 / 0 3 / 1 4 / 0 4 / 1 5 / 0 5 / 1 6 / 0 6 / 1 7 / 0 7 / 1	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	0 16 32 48 64 80 96 112 128 144 160 176 192 208 224 240	–––– –––– –––– ––––	15 31 47 63 79 95 111 127 143 159 175 191 207 223 239 255

8. software-disable each port on any associated SDI cards:

`LD 37`	
`DIS TTY x`	"x" is the number of the interface device attached to a port

`****`	Exit LD 37

> **Caution:**
>
> **Loss of Data**
>
> If the system terminal is assigned to an SDI port that is disabled, assign it to another port before the SDI is disabled.

9. Software-disable the associated IGS cards:

`LD 39`	
`DISI IGS x`	"x" is the IGS card number—0 to 19
`****`	exit LD 39

   ISR043 is displayed on the system terminal when the card is disabled. Busy channels are not disabled until the call is disconnected.

10. Set the ENB/DIS switch on the 3PE to DIS.
11. Tag and disconnect cables to the 3PE.
12. Unhook the locking devices on the card and pull the card out of the card cage.

Installing the replacement 3PE card

1. Set the ENB/DIS switch to DIS on the replacement 3PE card.
2. Set option switches on the replacement card with the same configuration as on the card that was removed.

   If there is a vintage change, be sure to check *Avaya Circuit Card Reference (NN43001-311)* for any differences.

3. Insert the replacement card into the vacated slot and hook the locking devices.
4. Connect cables to the replacement card.
5. Set the ENB/DIS switch to ENB on the replacement card.
6. Enable cards.

   Enable and test the CNI and 3PE cards:

`LD 135`	
`ENL CNI c s p`	CPU (0 or 1). Slot 12, port 0.

`****` Exit LD 135

If the LED on the 3PE card turns off, go to step 7 on page 301. If the LED stays lit, press the Man Int button to initialize the system.

If the 3PE card is in the Core/Network, enable the clock controller card:

```
LD 60
ENL CC x
****
```
Exit LD 60

If there is a problem, a CED or CCED system message is generated and the red LED is lit on the faceplate of the appropriate card.

7. Check to see that all cards were enabled.
8. Check the status of the IGS card:

```
LD 39
STAT IGS x
```
"x" is the IGS card number, 0 to 19

9. If the card is still disabled, enable it:

```
ENL IGS xx
****
```
Exit LD 39

10. Check the status of SDI ports:

`LD 37 STAT`

11. If any port still disabled, enable it:

```
ENL TTY x
****
```
Exit LD 37

12. Check the status of the peripheral signaling card:

```
LD 32
STAT PER x
```
Table 44: Peripheral signaling card numbers on page 299 lists peripheral signaling card numbers

13. If the card is still disabled, enable it:

```
ENPS x
```

`****`	Exit LD 32

14. Tag defective equipment with a description of the problem and package it for return to a repair center.

QPC471, QPC775, NTRB53 CLOCK CONTROLLER CARD

Use this procedure to replace a Clock Controller (CC) card.

Note:

The QPC775 Clock Controller is used in Canadian and International applications. QPC775 and QPC471 cards cannot be combined in one system.

See *Avaya ISDN Basic Rate Interface Maintenance (NN43001-718)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

Danger:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Removing the CC card

1. The clock controller card must be on the inactive CPU. To switch the active CPU:

   `LD 135 SCPU ****`

2. Disable the clock controller card:

   - The card being removed must be inactive:

     `LD 60`

   - In a single-CPU system:

Disable the clock controller card.	
`DIS CC x`	"x" is the card number—0 or 1

   - In a dual-CPU system:

Check the status of the clock controller card you are removing.	
`SSCK x`	"x" is the card number—0 or 1
If the clock is active, switch clocks.	
`SWCK`	Switch system clock from active to standby

Make sure the card being removed is disabled and the other clock controller card is active and in free run mode.

`SSCK x`

`TRCK FRUN`

Disable the clock controller card being removed.

`DIS CC x` "x" is the card number—0 or 1

3. Set the ENB/DIS switch to DIS on the card being removed.

Caution:

Service Interruption

To avoid interrupting service, set ENB/DIS switches to DIS before disconnecting or connecting cables.

4. Tag and disconnect cables to the card being removed.
5. Unhook the locking devices on the card and pull the card out of the card cage.

Installing the CC card

1. Set the ENB/DIS switch to DIS on the replacement card.
2. Set option switches on the replacement card.

   If there is a vintage change, be sure to check *Avaya Circuit Card Reference (NN43001-311)* for any differences.
3. Insert the replacement card into the vacated slot and hook the locking devices.
4. Connect cables to the replacement card.
5. Set the ENB/DIS switch to ENB on the replacement card.
6. Software-enable the card:

   `ENL CC x`

   Note:

   With a vintage H clock controller card, do not issue the tracking (TRCK) or status (SSCK) commands at this time. If these commands are used, the system may respond with an inaccurate error condition.

   - In a single-CPU system, complete the replacement procedure by exiting LD 60:

     `****`
   - In a dual-CPU system proceed with the following steps.
7. Switch CPUs:

   `LD 135 SCPU ****`
8. Activate the newly-installed card and verify that it is active:

```
LD 60 SWCK SSCK x
```

9. If applicable, issue a tracking command:

`TRCK aaa`	"aaa" is PCK for track primary clock, SCLK for track secondary clock, or FRUN for free run mode

Note:

Configure the clock source to the status it was in before the replacement procedure.

10. Verify clock switch-over and tracking:

```
SWCK
```

```
SSCK x
```

`****`	exit LD 60

11. Tag defective equipment with a description of the problem and package it for return to a repair center.

QPC477 Bus Terminating Unit

This section describes how to replace a Bus Terminating Unit (BTU).

Note:

Check the codes on all replacement BTUs.

QPC477-A10 and QPC477-B10 BTUs are interchangeable in NT8D35 Network Modules.

⚠ **Danger:**

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Replacing a BTU

1. Turn off power to the module:
   - With AC power, set the circuit breaker on the Module Power Distribution Unit (MPDU) to OFF (down).
   - With DC power, set the switch on the power supply to OFF (down).
2. Remove enough cards on both sides of the BTU to access the unit.

   See *Avaya Circuit Card Reference (NN43001-311)* for BTU slot locations.
3. Gently pull the BTU out of the card cage.

4. Insert the replacement BTU into the vacated slot.
5. Reinstall the cards on both sides of the BTU.
6. Turn on power to the module:
    - With AC power, set the MPDU circuit breaker to ON (up).
    - With DC power, set the power supply switch to ON (up).

    Note:

    As necessary, software re-enable cards in the module. See the appropriate replacement procedures in this document.
7. Tag defective equipment with a description of the problem and package it for return to a repair center.

QPC659 Dual Loop Peripheral Buffer Card

This section describes how to replace a Dual Loop Peripheral Buffer (DLB) card.

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

⚠ **Danger:**

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

⚠ **Caution:**

Service Interruption

Service is interrupted when a loop is disabled.

Removing the DLB card

1. Software-disable the DLB card:

    `LD 32`

    `DISS l s` "l s" are the loop and shelf numbers
2. Set the ENB/DIS switch to DIS.
3. Tag and disconnect cables to the card being removed.
4. Unhook the locking devices on the card and pull the card out of the card cage.

Installing the replacement DLB card

1. Set the ENB/DIS switch to DIS on the replacement card.
2. Set option switches on the replacement card in the same manner as on the card that was removed.

   If there is a vintage change, refer to check *Avaya Circuit Card Reference (NN43001-311)* for any differences.
3. Insert the replacement card into the vacated slot and hook the locking devices.
4. Connect cables to the replacement card.
5. Set the ENB/DIS switch to ENB on the replacement card.
6. Software-enable the replacement card by enabling the shelf:

   `ENLS l s`

   - When the process is complete, a system response is displayed.
   - If there is no problem, exit LD 32:

     `****`
7. Test each shelf:

   `LD 30 SHLF l s`

   - If there is a problem, an NWS system message is generated and the appropriate red LED is lit on the faceplate of the card.
   - If there is no problem, exit LD 30:

     `****`
8. Tag defective equipment with a description of the problem and package it for return to a repair center.

QPC841 Serial Data Interface Card

Use this procedure to replace an SDI card.

See *Avaya Software Input Output Maintenance (NN43001-711)* for a description of all maintenance commands, and the *Avaya Software Input Output Reference – System Messages (NN43001-712)* for interpreting system messages.

⚠ **Danger:**

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Caution:

Loss of Data

If the system terminal is assigned to the SDI being replaced, assign it to another port before this SDI is disabled.

Removing the SDI card

1. Software-disable each port on the SDI:

   `LD 37`

   `DIS TTY x` "x" is the number of the interface device attached to a port

2. Set the ENB/DIS switch to DIS.

   Caution:

   Service Interruption

   To avoid interrupting service, set ENB/DIS switches to DIS before disconnecting or connecting cables.

3. Tag and disconnect cables to the card being removed.
4. Unhook the locking devices on the card and pull the card out of the card cage.

Installing the replacement SDI card

1. Set the ENB/DIS switch to DIS on the replacement card.
2. Set option switches on the replacement card in the same manner as on the card that was removed.

   If there is a vintage change, be sure to check *Avaya Circuit Card Reference (NN43001-311)* for any differences.
3. Insert the replacement card into the vacated slot and hook the locking devices.
4. Connect cables to the replacement card.
5. Set the ENB/DIS switch to ENB on the replacement card.
6. Software-enable each port on the card:

   `ENL TTY x`

   - When the process is complete, a system response is displayed.
   - If there is a problem, an IOD system message is generated and the red LED is lit on the faceplate of the card.
   - If there is no problem, exit LD 37:

     `****`
7. Tag defective equipment with a description of the problem and package it for return to a repair center.

Replacing an NT7D10 PDU with an NT7D67CB PDU

This section describes how to replace an NT7D10 PDU with an NT7D67CB PDU in DC-powered systems.

Note:

The NT7D67CB PDU replaces the NT7D10 PDU. However, both PDUs can be used in a system.

Note:

Conduit is not required with the NT7D67CB PDU but can be used.

Before beginning this procedure, prepare for the installation:

- Additional wire may be required (see step 1 on page 308).
- An electric drill, fitted with a .234-in. metal bit must be available.
- A Rear Mount Conduit Kit (NT7D0902) must be available

Danger:

Module covers are not hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

Removing the PDU

1. Check the length of existing wire to the PDU. Due to the location of the field wiring terminal block on the NT7D67CB PDU, 6 to 9 inches more length is required to reach its terminals than is required to reach those on the NT7D10 PDU.

   Note:

   The existing service loop where wire enters the pedestal may enough excess length or enough slack wire may exist in the conduit path from the power plant to allow pulling a sufficient amount through to the pedestal.

   Figure 62: Field wiring terminals in the NT7D67CB PDU on page 313 shows the location on the NT7D67CB PDU to which wiring must extend. If existing wiring does not reach, replace the entire wire run from the power plant. Do not splice short pieces of wire onto the end of existing wiring.

   Note:

   If a QCAD321 or an NT6D53 junction box is installed on the power feed to the console, the wiring from the power plant may to be altered as follows:

   - If five #4 AWG wires are run from the power plant to the junction box (two BAT, two RTN, and one LRTN), then the junction box must not be used. The junction box must be removed and the entire wire run from the power plant to the pedestal must be replaced. Do not splice short pieces of wire onto the end of existing wiring.

- If nine #4 AWG wires are run from the power plant to the junction box (four BAT, four RTN, and one LRTN), then the junction box can be used. However, the #10 AWG wires from the junction box to the pedestal may to be replaced to provide sufficient length. Do not splice short pieces of wire onto the end of existing wiring.

2. Disconnect DC power at the source (not at the PDU).

> **Danger:**
> Before performing these procedures, disconnect the power at the source; simply turning off the circuit breakers does not shut off power to the system monitor.

3. Remove the grill on the rear of the pedestal.
4. Set all five circuit breakers on the PDU to OFF (down).

   Figure 59: NT7D10 Power Distribution Unit DC on page 309 shows the NT7D10 PDU in the rear of the pedestal.

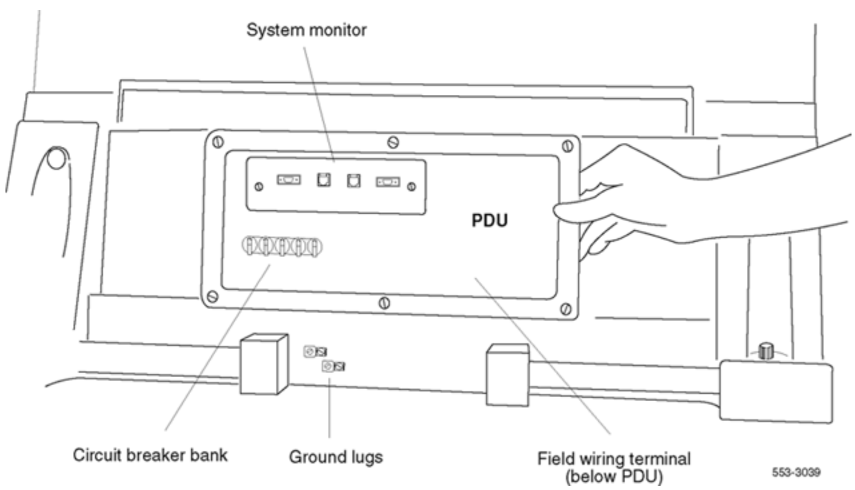

Figure 59: NT7D10 Power Distribution Unit DC

5. Unseat the blower unit in the front of the pedestal:
   a. Remove the grill on the front of the pedestal. Set the toggle switch on the front of the unit to OFF (left).
   b. Turn the screws on the front of the unit counterclockwise and pull the unit out several inches so the connector on the rear disengages.

> **Danger:**
> The unit is heavy and the blades on the blower may still be rotating up to two minutes after the power is turned off.

6. Disconnect cables to the module above the pedestal (module 0):
   a. Remove the rear cover on the module.

b. Remove the I/O safety panel over the backplane in the module.

c. Disconnect the system monitor ribbon cable from the PDU and from the module and set it aside for reconnection with the replacement NT7D67CB PDU.

d. Disconnect the large orange power connector (J1) from the PDU.

Note:

To disconnect the power plug, press a latch trip on the front and rear of the plug. It may be necessary to use a screwdriver blade against the latch trip on the front of the plug.

7. Tag and disconnect cables to the NT8D22 System Monitor card.

   Loosen the two screws on the card faceplate and remove it.

8. Remove the six screws that position the NT7D10 PDU.

   Carefully pull the unit straight out and set it on the floor next to the pedestal (see Figure 60: Dimensions for drilling holes on the pedestal on page 311)

⚠ Caution:

Damage to Equipment

The PDU cannot be completely removed from the pedestal until wires to the field wiring terminal block are disconnected. Label wires carefully. Improper wiring can cause system damage.

9. Label and disconnect all wiring to the field wiring terminal block.

10. Locate the frame ground wire from the field wiring terminal block to the frame ground bolt inside the pedestal.

    Disconnect this wire at the ground bolt.

11. Remove the field wiring terminal block:

    a. Remove the cover over the terminal block.

    b. Remove the four screws that secure the terminal block and lift it out of the pedestal.

12. Move the NT7D10 PDU out of the work area.

Installing the replacement PDU

⚠ Danger:

The NT7D67CB PDU is much heavier than the NT7D10 PDU.

Note:

The conduit attachment plate provided in the NT7D0902 Rear Mount Conduit Kit must be installed as a safety cover and to restrain wiring to the terminal block.

1. Drill two .234-in. screw holes in the rear of the pedestal (see Figure 60: Dimensions for drilling holes on the pedestal on page 311).

   The holes are used to install the conduit attachment plate.

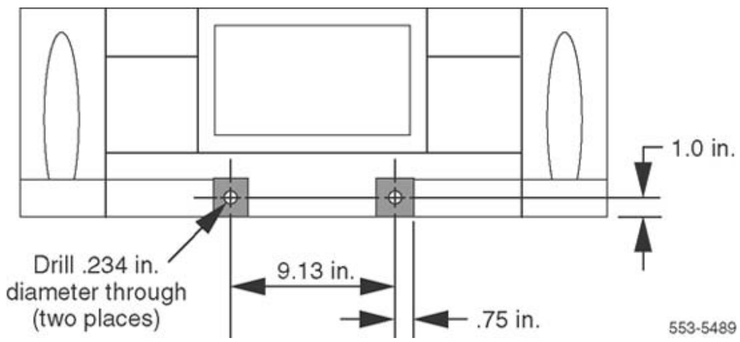

Figure 60: Dimensions for drilling holes on the pedestal

2. Place the NT7D67CB PDU next to the pedestal.

   Figure 61: NT7D67CB Power Distribution Unit DC on page 312 shows the PDU (labeled FLTR/PWR DIST UNIT ASSY on the equipment) and the NT7D10CA System Monitor/Power Supply Assembly (labeled XSM/PWR SUPPLY ASSY on the equipment).

   Note:

   The NT7D09CA Pedestal has a brace that supports a leveling bracket on the rear of the PDU. There is no room for the leveling bracket in the NT7D09AA Pedestal, so the bracket must be removed before the PDU is installed.

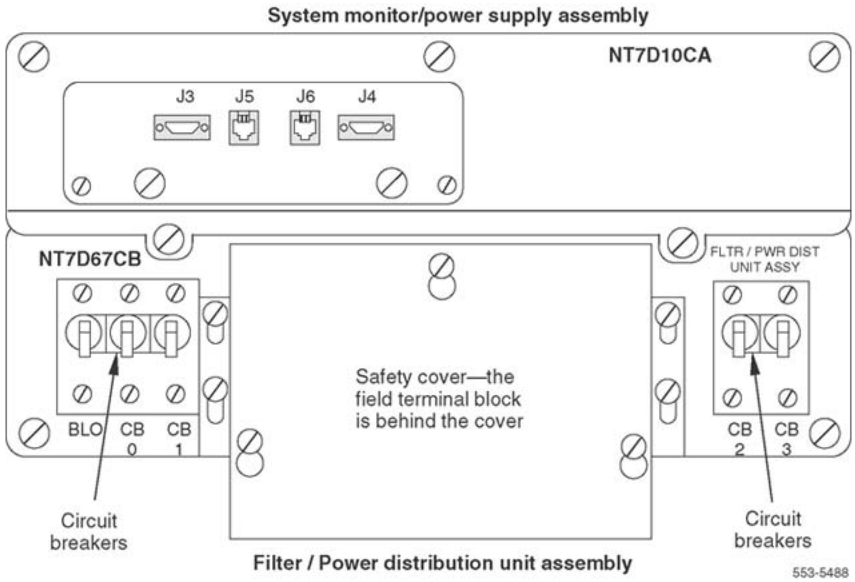

Figure 61: NT7D67CB Power Distribution Unit DC

3. Remove the two screws that secure the leveling bracket on the rear of the PDU.
4. Reinstall the screws to hold the rear cover on the PDU in place.

> ⚠ **Danger:**
>
> Support the PDU as far into the pedestal as possible without letting it drop to the bottom of the pedestal, but watch your hands!
>
> It becomes more difficult to support the PDU, the further into the pedestal it is inserted. The PDU is held in its proper position only when the mounting screws on its faceplate are tightened.

5. Install the NT7D67CB PDU:
    a. Connect the green frame ground wire from the PDU to the frame ground bolt inside the pedestal.
    b. Guide the power cable connector through the hole in the top of the pedestal. Set the PDU in the pedestal and tighten the three screws that secure it to the pedestal.
6. Install the NT7D10CA system monitor assembly:
    a. Connect the small orange connectors (J2 on the PDU, P2 on the system monitor assembly) on the left side of the PDU.
    b. Connect the flat white connector to the small circuit board (P1 on the PDU, J1 on the system monitor assembly) on the right side of the PDU.
    c. Connect the ribbon cable (set aside when the NT7D10 PDU was removed) to the system monitor (J2).

Guide the connector on the other end of the cable through the hole in the top of the pedestal and connect it to module 0.

d. Gently push the system monitor assembly into the pedestal.

7. Tighten the screws that secure the system monitor assembly.
8. Reconnect the cables from module 0:

   a. Reconnect the large orange power connector (J1).

   b. Replace the I/O safety panel.

   c. Replace the rear cover on the module.

9. Reconnect all external wiring to the terminal block on the PDU.

   See Figure 62: Field wiring terminals in the NT7D67CB PDU on page 313.

   a. Remove the plastic safety cover over the terminal block.

   b. Connect the red BAT (–48 V) wires:

      • for modules 0 and 1 connect to the BAT 0,1 terminal

      • for modules 2 and 3 connect to the BAT 2,3 terminal

   c. Connect the black BATRTN (48 V return) wires:

      • for modules 0 and 1 connect to the BATRTN 0,1 terminal

      • for modules 2 and 3 connect to the BATRTN 2,3 terminal

   d. Connect the orange (or white) wire from the ground bus/LRE in the power plant to the LRTN terminal.

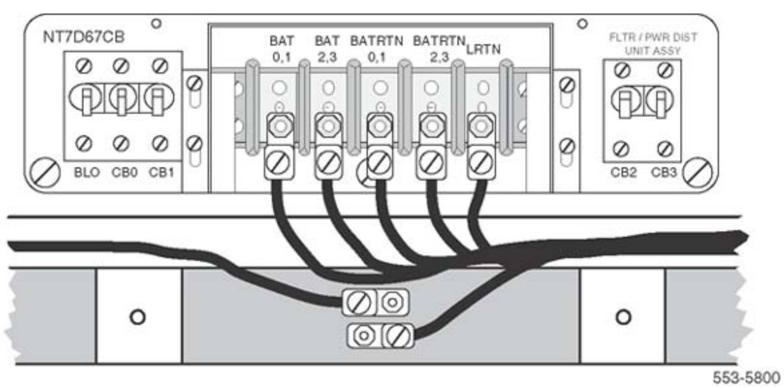

Figure 62: Field wiring terminals in the NT7D67CB PDU

10. Position the conduit attachment plate on the rear of the pedestal (over the newly drilled holes) and secure it with two screws, nuts, and washers.
11. Reinstall the plastic safety cover over the terminal block.
12. Reseat the blower unit:

a. Lift the unit slightly and slide it into the pedestal glides. Set the toggle switch to ON (right).

b. Tighten the screws on the front of the unit.

c. Replace the front pedestal grill.

13. Insert the system monitor card. Tighten the screws on the card faceplate. Reconnect cables to the system monitor.

14. Set all five circuit breakers on the PDU to OFF (down). Reconnect the source of DC power.

15. One at a time, starting with the breaker for the blower unit, set the circuit breakers on the PDU to ON (up). Make sure the green LED is lit on the power supply unit(s) in each module.

    Note:

    On initial power up the blower may rotate slower than expected. As the sensor detects heat, the blower rotates more rapidly.

16. Replace the rear pedestal grill.

17. Tag defective equipment with a description of the problem and package it for return to a repair center.

Glossary

3PE card	QPC441 Three-Port Extender Card
BTU	QPC477 Bus Terminating Unit
CBT	Core Bus Terminator
CE	Common Equipment
CE/PE	Common/Peripheral Equipment
CMA card	Changeover and Memory Arbitrator Card
CMDU card	Core Multidisk Unit Card
Conference/TDS card	NT8D17 Conference/Tone and Digit Switch Card
CNI	Core to Network Interface
CP	Call Processor
CPU	Central Processing Unit
DLB card	QPC659 Dual Loop Peripheral Buffer Card
DTR card	Digitone Receiver Card
Network/DTR card	NT8D18 Network/Digitone Receiver Card
FDI card	QPC742 Floppy Disk Interface Card
FDU	NT8D68 Floppy Disk Unit
FN card	QPC579 CPU Function Card
IF card	QPC580 CPU Interface Card
IOP	Input/Output Processor
IPE	Intelligent Peripheral Equipment
MDU	NT8D69 Multi Disk Unit
MSI card	QPC742 Mass Storage Interface Card
IPE	Intelligent Peripheral Equipment

PS card	QPC43 Peripheral Signaling Card
ROM cards	Read-Only Memory Cards
SBE	QPC215 Segmented Bus Extender Card
SDI cards	Serial Data Interface Cards
UPS	Uninterruptible Power Supply

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